Color Data Software CM-S100w

SpectraMagic™ NX

Professional/Lite

Ver. 2.6

E Instruction Manual

KONICA MINOLTA

Formal designations of application software used in this manual

(Designation in this manual)	(Formal designation)
Windows, Windows Vista	Microsoft® Windows® Vista Business Operating System
Windows, Windows 7	Microsoft® Windows® 7 Professional Operating System
Windows, Windows 8	Microsoft® Windows® 8 Pro Operating System
Windows, Windows 8.1	Microsoft® Windows® 8.1 Pro Operating System

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About this manual

- Some of the screen capture shots in this manual may be from previous versions.

Introduction

The SpectraMagic NX software is color data software designed to connect spectrophotometers such as the CM-3600A or chroma meters to a PC (personal computer) to enable the measurement and graphic display of sample data, as well as various other operations.
The SpectraMagic NX is available as two types: The Professional Edition, which features a variety of functions, and the Lite Edition, which features only basic functions.

Safety Precautions

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

Package Contents

- Installation DVD-ROM of SpectraMagic NX (Qty: 1)
- USB protection key
- Installation Guide
- Authorized Service Facility

The Instruction Manual is also installed in PDF form with a shortcut in the start menu during the software installation.

To read the manual, go to Start Menu → All programs → KONICAMINOLTA → SpectraMagic NX → SpectraMagic NX Manual.

Versions of the Instruction Manual in other languages are also included on the installation DVD-ROM.

You will need Adobe Reader® from Adobe Corporation. The latest Adobe Reader® can be downloaded for free from the Adobe website. Also, it is possible to use the Adobe Reader® installer included on the installation DVD-ROM.

(Example) When the DVD-ROM is in E drive E:\Adobe Reader\EN

If you want to view the instruction manual while using the software, select *Help - Instruction Manual* from the menu bar.

Software License Agreement

The terms of the license agreement of the SpectraMagic NX 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

- The SpectraMagic NX application software is designed to be used with the Windows Vista, Windows 7, Windows 8 or Windows 8.1 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.
- When inserting the DVD-ROM into the DVD-ROM drive, note the correct orientation of the disc. Insert it gently.
- Keep the DVD-ROM clean and free from scratches. If the recorded surface becomes dirty or the label surface is scratched, a read error may result.
- Avoid exposing the DVD-ROM to rapid temperature changes and condensation.
- Avoid leaving it in locations where it may be exposed to high temperatures from direct sunlight or heaters.
- Do not drop the DVD-ROM or subject it to strong impact.

- Keep the DVD-ROM away from water, alcohol, paint thinners, and other such substances.
- Remove the DVD-ROM from the DVD-ROM drive while the computer is turned on.

Notes on Storage

- After using the DVD-ROM, return it to its case and store in a safe place.
- Avoid leaving the DVD-ROM in locations where it may be exposed to high temperatures from direct sunlight or heaters.
- The DVD-ROM should not be kept in areas of high humidity.

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.

Contents

Chapter 1
Overview

1.1 System Requirements

1.1.1 System Requirements

OS	Windows Vista Business 32-bit Windows Vista Business 64-bit Windows 7 Professional 32-bit Windows 7 Professional 64-bit Windows 8 Pro 32-bit Windows 8 Pro 64-bit Windows 8.1 Pro 32-bit Windows 8.1 Pro 64-bit • (English, Japanese, German, French, Spanish, Italian, Portuguese, Simplified Chinese, Traditional Chinese, and Hangul versions) The hardware of the computer system to be used must meet or exceed the greater of the recommended system requirements for the compatible OS being used or the following specifications.
Computer	PC equipped with a processor equivalent to Pentium III 600MHz or better
Memory	128 MB (256 MB recommended)
Hard disk drive	450 MB of available hard disk space At least 400 MB of available disk space is required on the system drive (drive where the OS is installed).
Display	Display hardware capable of displaying 1024 x 768 pixels / 16-bit color or better
Optical disc drive	DVD-ROM drive
USB or parallel port	Required for protection key
USB or serial port	Required for instrument
USB port	Required for Bluetooth® adapter when the CM-700d/600d is connected by using Bluetooth® communication
Browser	Internet Explorer Ver. 5.01 or later

1.1.2 Compatible Instruments

CM-3700A, CM-3700A-U, CM-3600A, CM-3610A, CM-3700d, CM-3600d, CM-3610d, CM-3630, CM-3500d, CM-2600d/2500d, CM-2500c, CM-700d/600d, CM-512m3A, CM-512m3, CM-5/CR-5, CR-400/410, DP-400

1.1.3 Language

Display language	English, German, French, Spanish, Italian, Portuguese, Japanese, Chinese (Simplified and Traditional) (Select one during installation.)

1.2 Major Functions

Items marked with Ⓟ are supported only by SpectraMagic NX Professional Edition.

Color space L*a*b*, L*C*h, Lab99, LCh99, XYZⓅ, Hunter Lab, YxyⓅ, L*u'v'Ⓟ, L*u*v*Ⓟ, Munsell C, Munsell D65 and their color differences (Excluding Munsell C and Munsell D65)

Index MI, WI (CIE1982Ⓟ, ASTM E313-73Ⓟ, ASTM E313-96Ⓟ, HUNTERⓅ, BERGERⓅ, TAUBEⓅ, STENSBYⓅ, GanzⓅ), Tint (CIE1982Ⓟ, ASTM E313-96Ⓟ, GanzⓅ), YI (ASTM D1925-70Ⓟ, ASTM E313-73Ⓟ, ASTM E313-96Ⓟ, DIN6167Ⓟ), WB (ASTM E313-73)Ⓟ, Standard Depth (ISO 105.A06Ⓟ), Brightness (TAPPI T452Ⓟ, ISO2470Ⓟ), Opacity (ISO 2471Ⓟ, TAPPI T425 89% White Plate Ⓟ), Haze (ASTM D1003-97Ⓟ), Density (Status AⓅ, Status TⓅ), Dominant WavelengthⓅ, Excitation PurityⓅ, RxRyRzⓅ, Gardner, Hazen (APHA) colour scale, Iodine color number, European Pharmacopoeia, US Pharmacopeia, 8 degree gloss value (CM-3600A, CM-3610A, CM-3600d, CM-2600d/2500d, CM-700d/600d only)Ⓟ, user equationⓅ, each difference, 555Ⓟ

Note on Haze (ASTM D1003-97):
With some instrument types, the illumination/observation system may not satisfy the definition of haze (ASTM D1003-97). However, this presents no problem as long as the value is used as a relative value.

Color difference equation ΔE^*_{ab} (CIE 1976), ΔE^*_{94} (CIE 1994)Ⓟ and each component of lightness, saturation and hue, ΔE_{00} (CIE 2000) and each component of lightness, saturation and hue, ΔE_{99} (DIN99), ΔE (Hunter), CMC (I:c)Ⓟ and each component of lightness, saturation and hue, FMC-2Ⓟ, NBS 100Ⓟ, NBS 200Ⓟ, ΔEc (degree) (DIN 6175-2)Ⓟ, ΔEp (degree) (DIN 6175-2)Ⓟ

Index Difference StrengthⓅ, Pseudo StrengthⓅ, Staining degree (ISO 105.A04E)Ⓟ, Staining degree rating (ISO 105.A04E)Ⓟ, Grey scale (ISO 105.A05)Ⓟ, Grey Scale Rating (ISO 105.A05)Ⓟ, K/S strength (Apparent (ΔE^*_{ab}, ΔL*, ΔC*, ΔH*, Δa*, Δb*) maximum absorption, total wavelength, user wavelength)Ⓟ, NC#Ⓟ, NC# GradeⓅ, NsⓅ, Ns GradeⓅ

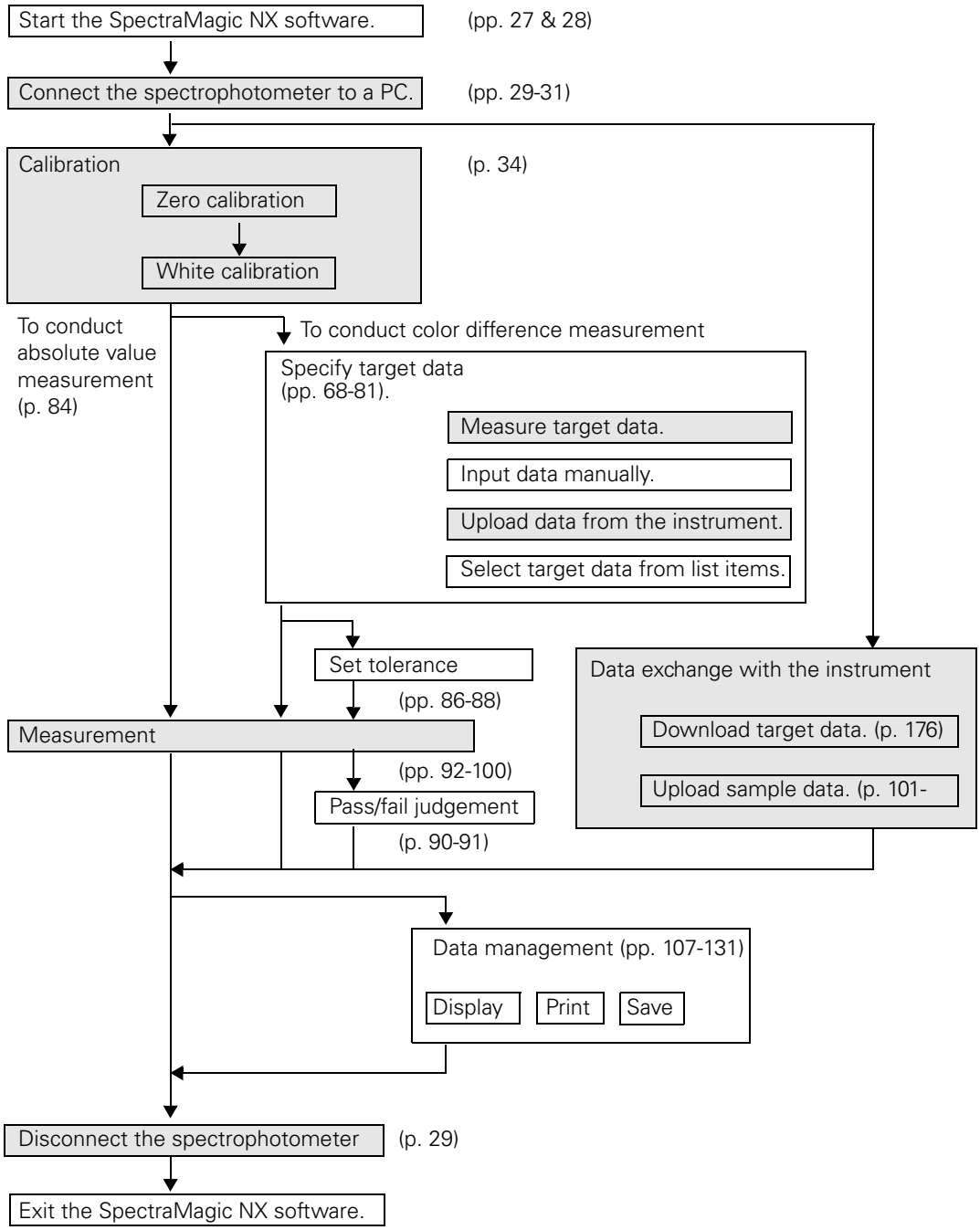
Notes concerning displayed values:
The SpectraMagic NX software enhances calculation accuracy by performing internal calculations with numbers greater in magnitude than those actually displayed. Consequently, the least significant digit displayed may differ from that of the instrument by one digit due to rounding or color space conversion.
Because the tolerance judgement calculation and graph-plotted points are also processed with numbers greater in magnitude than those actually displayed, the judgement result or plotted points may differ from those obtained with the values displayed on the instrument.

Each colorimetric value of the data measured with a spectrophotometer or obtained by manual input of spectral reflectance data is calculated from spectral reflectance. Each colorimetric value of the data measured with a colorimeter or obtained by manual input of colorimetric data is calculated from XYZ data. As a result, the colorimetric value of the average value obtained by the manual averaging measurement or by the averaging of list data may differ from the average of colorimetric values displayed in the list.

Observer 2 degree , 10 degree

Illuminants	A, C, D_{50}, D_{55}Ⓟ, D_{65}, D_{75}Ⓟ, F_2, F_6Ⓟ, F_7Ⓟ, F_8Ⓟ, F_{10}Ⓟ, F_{11}, F_{12}Ⓟ, U_{50}Ⓟ, ID_{50}, ID_{65}, User illuminant 1 to 3 Up to three illuminants can be displayed simultaneously.
Graph	Spectral reflectance/(transmittance) and its difference, L*a*b* absolute value, ΔL*a*b* (color difference distribution, MI, 3D), Hunter Lab absolute value, Hunter ΔLab (color difference distribution), Trend chart and histogram of each color space and color difference equation, Pseudo Color display
Image display	Can be linked to sample data and images (JPEG or BMP).
Instrument control functions	Measurement/calibration Automatic averaging measurement: 2 to 999 measurements Manual averaging measurement: Optional (user-determined) number of times (The standard deviation and average for the color space selected for measurement are displayed.) Remote measurement (Excluding CM-3000 Series) Downloading of configuration data to the instrument (Excluding CM-3000 Series) Uploading of data stored in instrument memory (Excluding CM-3000 Series)
Target data	Two or more pieces of target data can be registered (automatic selection). Colorimetric data can be registered manually by specifying the color space. Target data can be downloaded to the instrument. (Excluding CM-3000 Series)
Data list	Listing of target data and sample data Editing (delete, sort, average, copy & paste, search, file merge) Link between JPEG images, Display of statistic value and pass/fail ratio, Visual judgement result input function, Additional data information inputting/listing function
External I/O	Uploading/saving of data file(s) in original formats (with “mes” file extension). Uploading/saving of template file(s) in original format (with “mtp” file extension). Uploading/saving of data in text format. Saving of data in XML format. Copying of lists in clipboard.
Help	Navigable display, “Precise Color Communication” Tutorial, Manual

1.3 Operation Flow



The shaded sections indicate functions available only when the spectrophotometer is connected and the protection key is attached to the computer.

1.4 Window Configuration

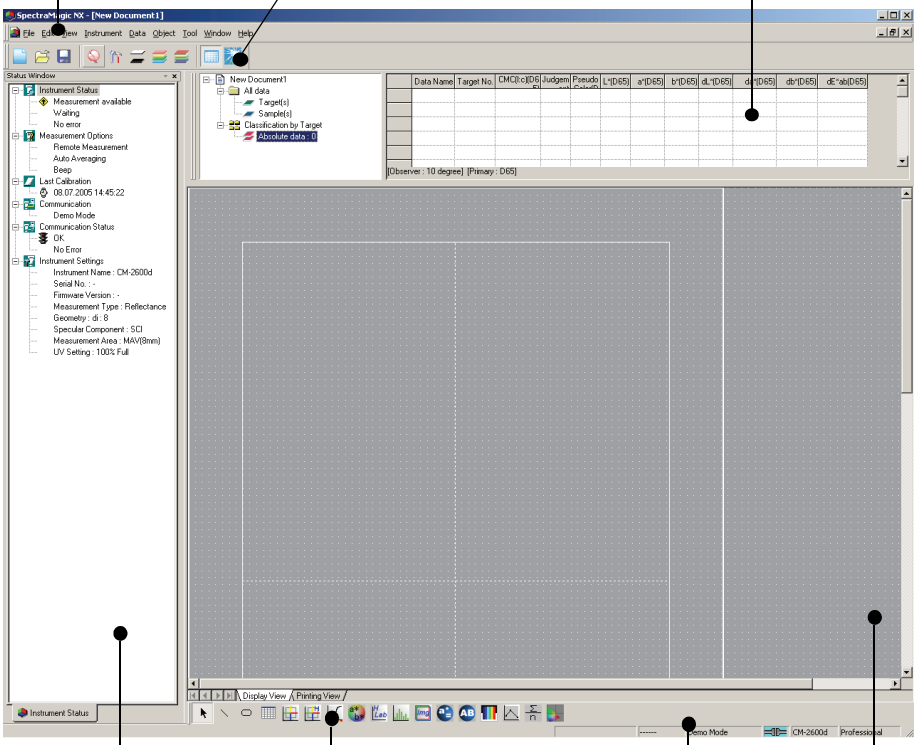
1.4.1 Operation Window

The SpectraMagic NX software includes the following windows and bars.

Menu bar (p. 11)
Shows functions categorized among menus.

Standard toolbar (p. 13)
Displays icons corresponding to frequently used functions.

List window (p. 17)
Displays sample data.



Status window (p. 21)
Displays the detailed status of the instrument.

Tool icon bar (p. 18)
Displays icons representing graphic objects. You can select graphic objects from this bar and place them in the canvas window.

Status bar (p. 22)
Displays the details or status of each function of the SpectraMagic NX.

Canvas window (p. 17)
Graphic objects are pasted in this window.

1.4.2 Menu Bar

When the SpectraMagic NX software is started, a menu bar appears at the top of the window in a manner similar to other Windows-based software. This section lists the functions available in the menu bar and the manual pages on which these functions are described.

File

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- Upload/Download
  - Upload Samples 101
  - Upload Target 79

- Download Target 176

- Clear Stored Data

- Set Calibration Data 159
- Standard Configuration 163

- Standard Configuration 163

- User Index 174
- Initialize Instrument

The commands under the Instrument menu are available only when the spectrophotometer or the chroma meter is connected and the protection key is attached to the computer.

Instrument - Standalone Configuration - User Index menu is displayed only when the CR-400/410 is connected.

Data

Object

Tool

Window

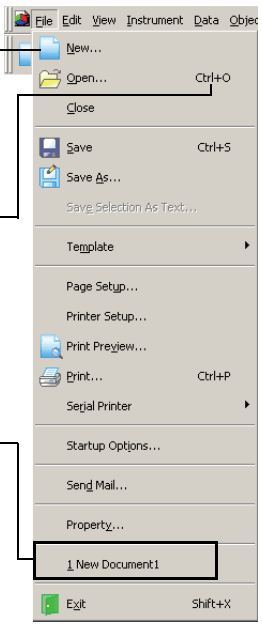
Help

Items marked with Ⓟ are supported only by SpectraMagic NX Professional Edition.

In the standard toolbar, this icon represents the command. See page 13 for details.

Shortcut keys for this command. See page 16 for details.

Documents recently opened with the SpectraMagic NX software. (Up to five files are displayed.)



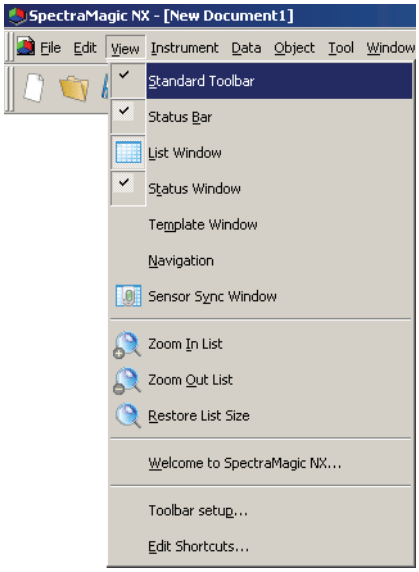
1.4.3 Standard Toolbar

The standard toolbar contains buttons corresponding to frequently used functions. 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.
- The buttons can be displayed in two different sizes and can be arranged in any order desired.

Showing/hiding the standard toolbar

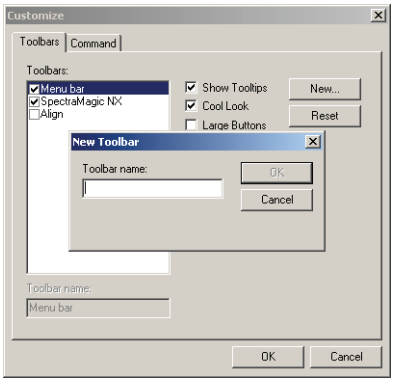
Click *View* - *Standard Toolbar* in the menu bar to show/hide the standard toolbar.



Customizing the standard toolbar

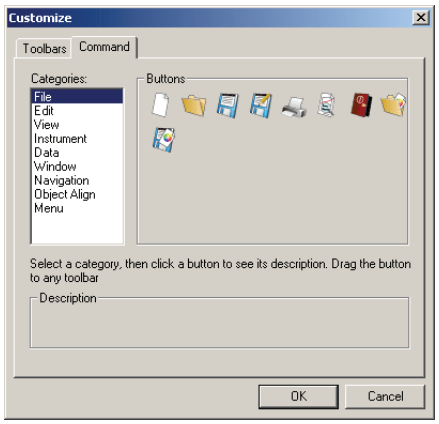
To customize your toolbar with a desired combination of icons, select *View* - *Toolbar setup* from the menu bar.

1. Click the New button.
2. Type the name of a toolbar and click the OK button.



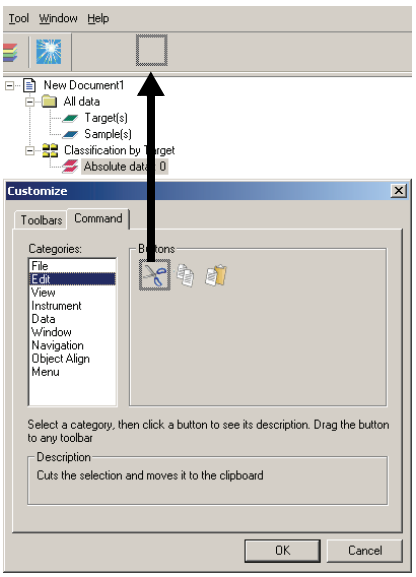
3. Select the Command tab and select the category of icon you want to add to the new toolbar from the list displayed below Categories.

The button icons for the selected category are displayed in the Buttons area.

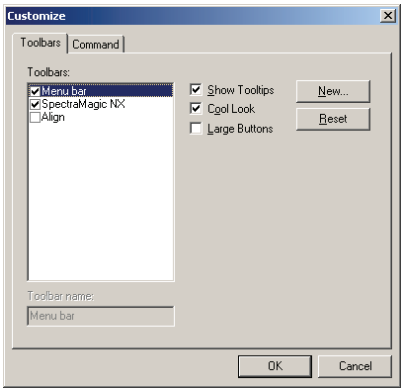


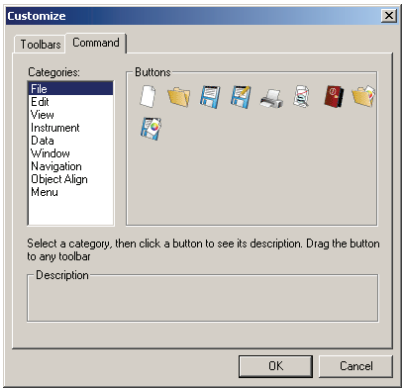
4. Drag-and-drop the button icon to the new toolbar.

The button appears in the toolbar.



■ Settings in the Customize dialog box



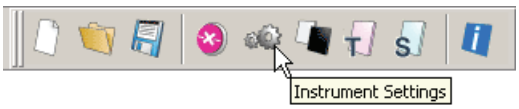


Toolbars tab

SpectraMagic NX
This is the standard toolbar. When this item is checked, the standard toolbar appears. Uncheck this item to hide the toolbar.
To return to the initial setting, click the Reset button.

Align
This is the graphic object alignment bar. When this item is checked, the graphic object alignment bar appears. Uncheck this item to hide the bar.
To return to the initial setting, click the Reset button.

Show Tooltips
Position the mouse pointer over a button to see brief explanation of the function of the icon displayed as a tooltip.
Check this option to have a tooltip appear. Uncheck this item if you do not want a tooltip to appear.

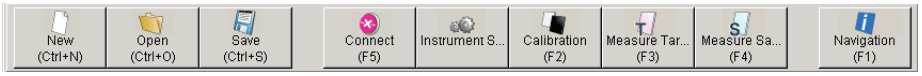


Cool Look
The appearance of the icons shown on the toolbar can be changed.
When this option is checked, the icons normally appear flat but change to a three-dimensional button appearance when the mouse pointer is positioned over them.

Cool look display

Button display

Large Buttons
The default size of the icons in the toolbar can be increased to a larger size with a text description of each button displayed below the icon.



Command tab

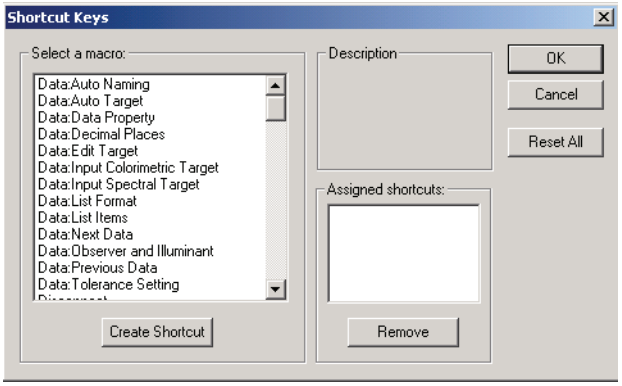
Select this tab to add or remove the buttons appearing in the toolbar.

1.4.4 Shortcut Keys

You can also access the menu commands of the SpectraMagic NX software simply by pressing various shortcut keys.

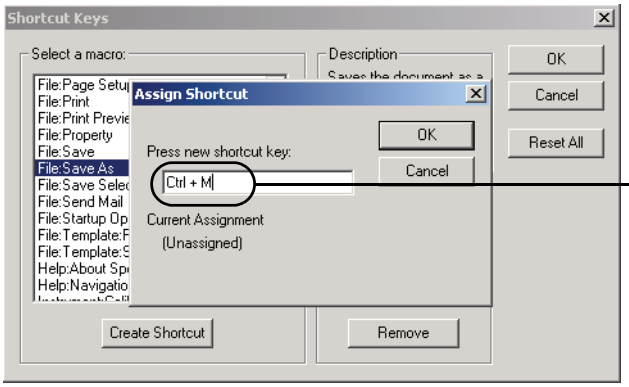
Editing shortcut keys

You can customize the shortcut keys by selecting *View* - *Edit Shortcuts* from the menu bar.



1. To create a shortcut or edit an existing shortcut key, select the desired process under “Select a macro.”
2. Click the Create Shortcut button.
3. The Assign Shortcut dialog box opens. Press the key(s) you want to assign to the shortcut.

   In the box below “Press new shortcut key:”, “Ctrl” and the key(s) you pressed are displayed. If you pressed any key while holding down the Shift or Alt key, or if you pressed a function key, the key(s) you pressed will be displayed.
   If the key(s) you pressed have already been assigned to another macro, the corresponding macro is displayed below “Current Assignment.” If the key is not assigned to any macro, “(Unassigned)” is displayed.



4. Click the OK button.

■ Shortcut Keys dialog box

Create Shortcut
Press this button to create a new shortcut.

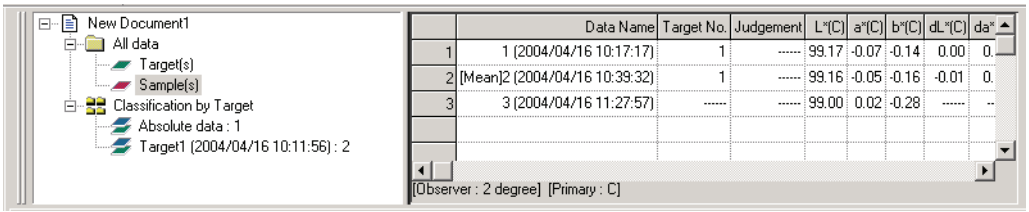
Reset All
Press this button to reset all shortcuts that have been created. The SpectraMagic NX software returns to the initial settings as shown on pages 11 and 12.

Remove
Select a macro whose shortcut you want to delete. Select its shortcut and click this button to delete it.

1.4.5 List Window

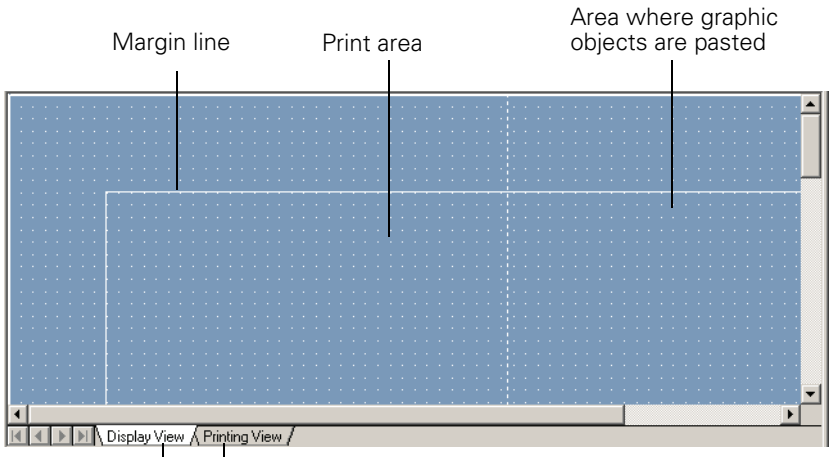
The list window lists the sample data.

Each document file has its own list window. When the canvas window is closed, the list window also closes.



1.4.6 Canvas Window

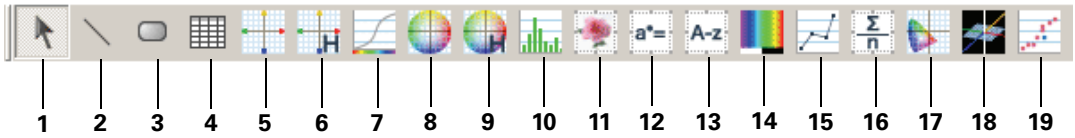
The canvas window is the window in which graphic objects are pasted.
Two views of the canvas window are available for each document file: Display View and Printing View. In edit mode, graphic objects can be placed differently in each window as desired.



View selection tabs
Ⓟ Used to switch the canvas window between the display and printing views. Right-clicking the tab opens the pop-up menu, which you can use to add a new view.
(Ⓟ Supported only by SpectraMagic NX Professional Edition)

1.4.7 Tool Icon Bar

You can select graphic objects from this bar and place them in the canvas window.
This bar appears in the window when the SpectraMagic NX software is in edit mode.



1) Selection tool

2) Line object

3) Rectangle object

4) Data list object

5) Color difference graph (ΔL*a*b) object

6) Color difference graph (ΔHunter Lab) object

7) Spectral graph object

8) Absolute graph (L*a*b) object

9) Absolute graph (Hunter Lab) object

10) Trend chart/histogram object

11) Image object

12) Numeric label object

13) String label object

14) Pseudo color object

15) Line graph object

16) Statistic object

17) xy chromaticity object

18) 3D (ΔL*a*b*) graph object

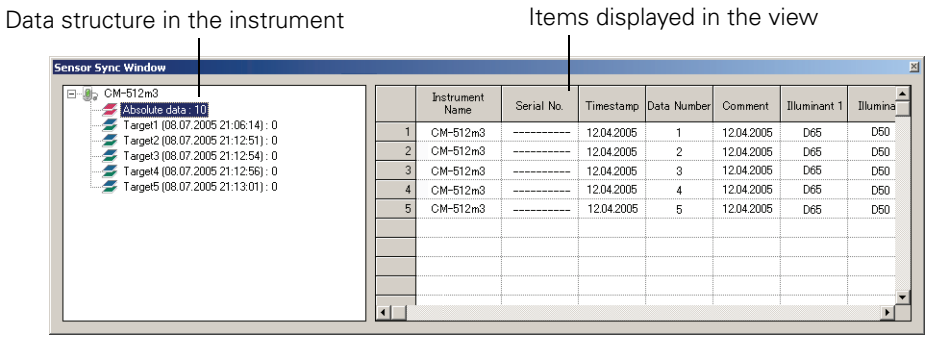
19) Two-axis graph object

For details of the graphic objects, see “Graphic Object Properties” on page 199.

1.4.8 Sensor Sync Window

This procedure is available only when the spectraphotometer excluding the CM-3000 Series or the chroma meter is connected and the protection key is attached to the computer.

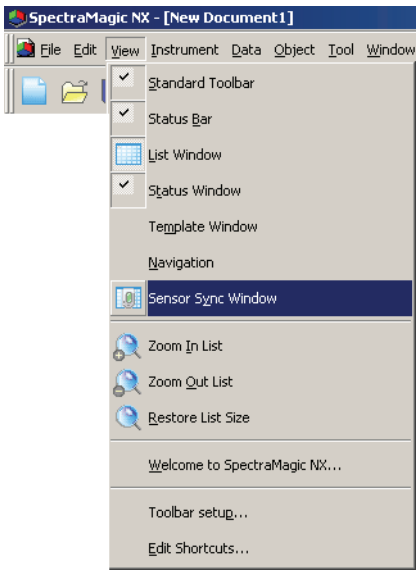
This window shows the data structure (the relationship between target data and sample data), in the instrument connected to SpectraMagic NX software.
Since the data is displayed in a tree structure, it is easy to select only necessary data and upload it in the document file or download it to the instrument.
For details of the sensor sync function, refer to page 184.



■ Showing/hiding the sensor sync window

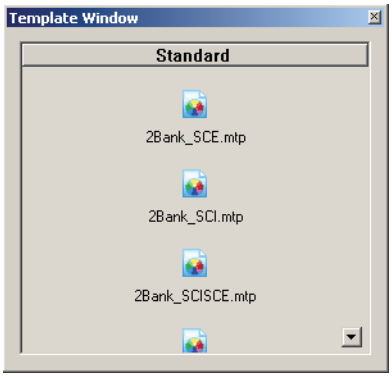
The sensor sync window is not displayed when SpectraMagic NX software is started for the first time.

Select *View* - *Sensor Sync Window* from the menu bar to show or hide the sensor sync window.



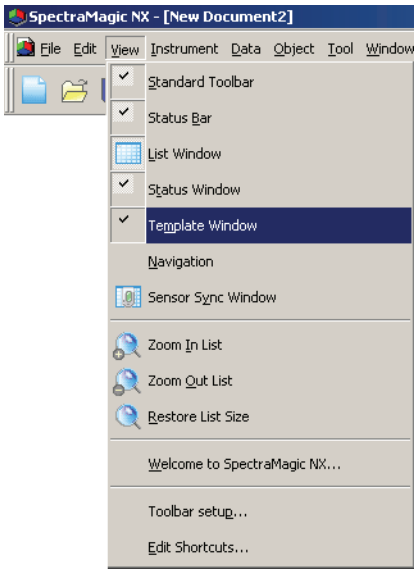
1.4.9 Template Window

This window displays icons for template files. By selecting the icon from this window, you can change templates easily. For details of template files, refer to page 132.



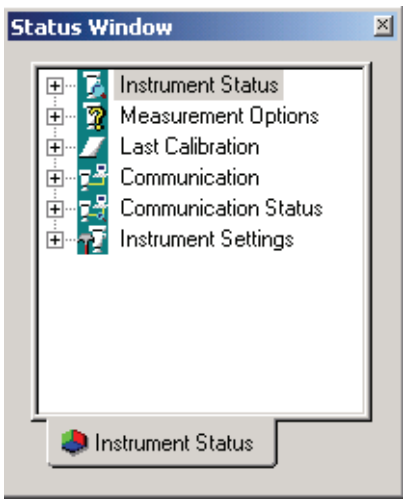
Showing/hiding the Template Window

The Template Window is not displayed when SpectraMagic NX software is started for the first time. Select *View* - *Template Window* from the menu bar and select to show or hide the Template Window.



1.4.10 Status Window

The status window displays the operating status and communication status of the spectrophotometer.



Examples of displayed comments are as follows:

Instrument Status

- ├ Measurement available/ Not connected/ ◆Zero Calibration is required./ ◇White Calibration is required.
- ├ Measuring/ Calibrating/ Configuring/ Uploading/ Downloading
- └ Low Battery/ Flash Error

Measurement Options

- ├ Remote Measurement
- ├ Auto Averaging
- └ Beep

Last Calibration

- └ (Time display)

Communication

- └ RS-232C (with specified parameters such as COM and bps)

Communication Status

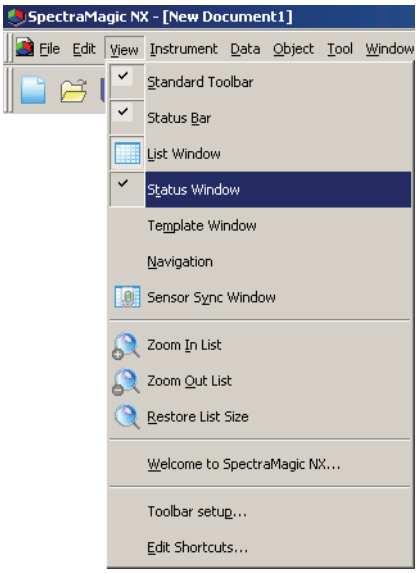
- ├ OK/ Communicating/ Not connected/ Error

Instrument Settings

- ├ Instrument Name
- ├ Instrument status 1
- ├ Instrument status 2
- └ Instrument status 3

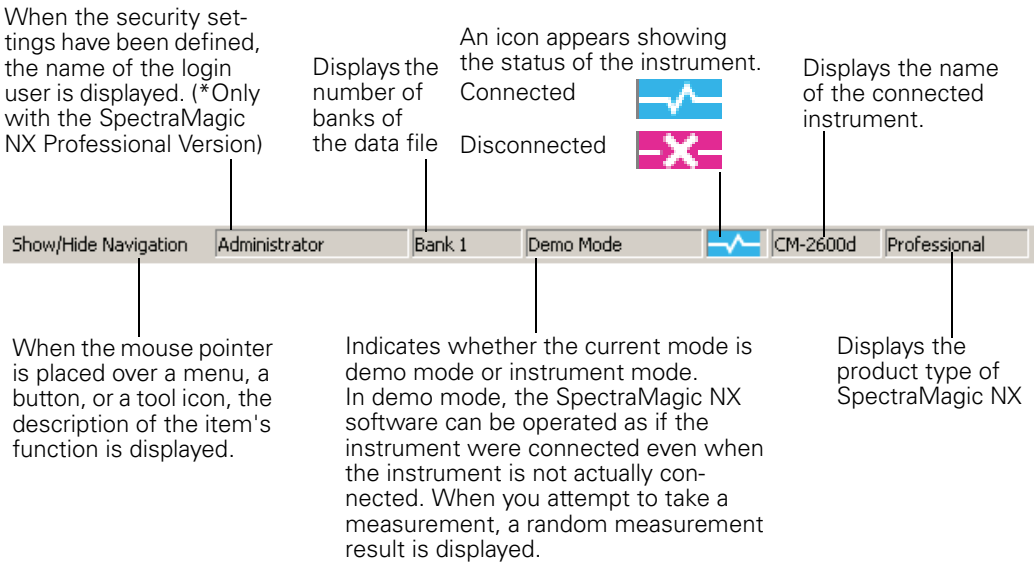
■ Showing/hiding the status window

You can show or hide the status window by selecting *View* - *Status Window* from the menu bar.



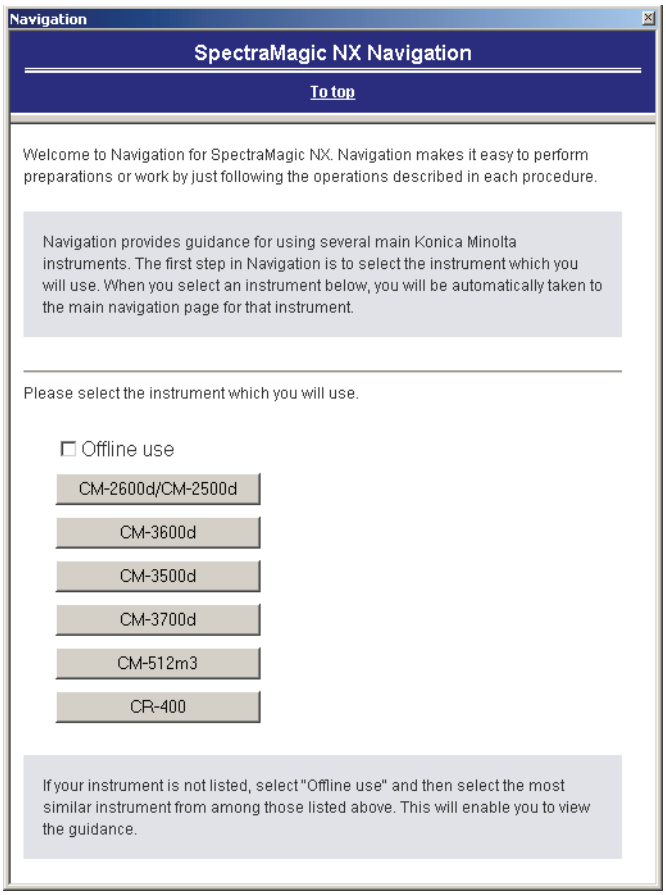
1.4.11 Status Bar

Displays the details or status of each function of the SpectraMagic NX.



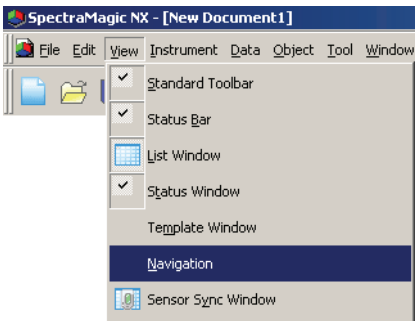
1.4.12 Navigation Window

The Navigation window displays the operation guide for the SpectraMagic NX software.



Showing/hiding the Navigation window

You can show or hide the Navigation window by selecting *View* - *Navigation* from the menu bar.



CHAPTER 2
OPERATION GUIDE

Items marked with Ⓟ are supported only by SpectraMagic NX Professional Edition.

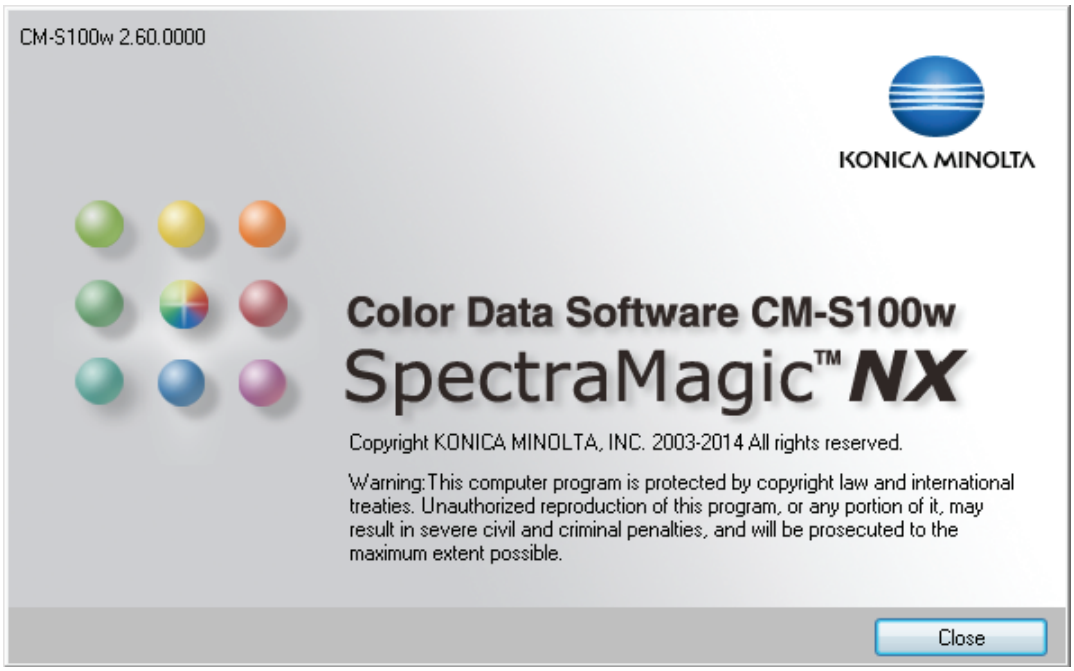
2.1 Starting the SpectraMagic NX software

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

Many functions of SpectraMagic NX require a protection key before they are available for use. Refer to page 9 for an overview of the functions that can be used only when the protection key is attached. The protection key is also necessary to start the SpectraMagic NX software for the first time.

Select the SpectraMagic NX icon registered with the Start menu. You can also start the software by selecting the data file. When the SpectraMagic NX software starts, the following splash screen appears.

■ Splash screen



■ Version information

You can also display the splash screen by selecting *Help* - *About SpectraMagic NX* from the menu bar. The current version of the SpectraMagic NX software is shown at the upper left corner of the screen.

2.1.1 Starting the SpectraMagic NX Software for the First Time

The first time the SpectraMagic NX software starts, the “Welcome to SpectraMagic NX” dialog box appears.

■ Welcome to SpectraMagic NX dialog box

Navigation

Open Navigation

Click this button to close the dialog box and show the Navigation window.

Display Style

Simple, Standard, Detailed

Click one of the radio buttons to display a preview of the corresponding view on the right. Click the OK button to close the dialog box and display the operation window in the selected view.

Don't show this dialog at startup

Leave this box unchecked to view the Welcome to SpectraMagic NX dialog box the next time you start the SpectraMagic NX software. You can view this dialog box at any time by selecting *View* - *Welcome to SpectraMagic NX* from the menu bar.

2.1.2 Establishing Connection with the Spectrophotometers or the Chroma Meter

This procedure is available only when the spectrophotometer or the chroma meter is connected and the protection key is attached to the computer.

To establish a connection with the spectrophotometer or the chroma meter, select *Instrument* - *Connect* from the menu bar or click the icon in the toolbar. All detailed information about the connection is displayed in the status window.

Connecting to the spectrophotometer or the chroma meter

When the SpectraMagic NX software is started for the first time, a connection is made automatically to the instrument, and the type of the instrument is detected automatically. To establish a connection manually, follow the procedure below:

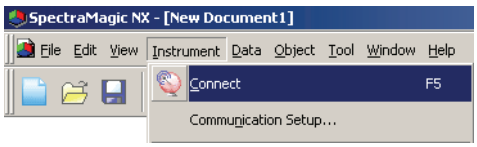
When you use the CM-700d/600d or CM-5/CR-5, you need to complete the communication setting before connecting the instrument. For the procedure of the communication setting, refer to page 31.

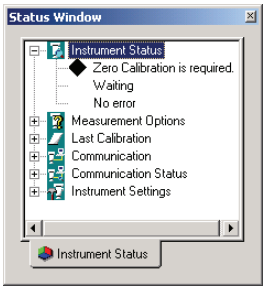
Up to four CM-700d/600d units can be connected by using either USB connection or Bluetooth® communication.

If you want to connect several units of the CM-700d/600d, complete the connection for the first unit, and then configure the communication setting for the following units.

1. Select *Instrument* - *Connect* from the menu bar.

   The SpectraMagic NX software connects to the instrument and the status of the instrument is displayed in the status window. Once the connection is established, *Disconnect* appears in the Instrument menu instead of *Connect*.

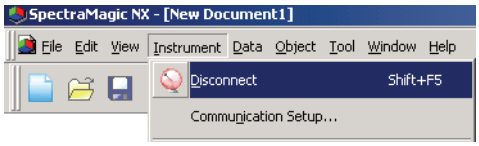


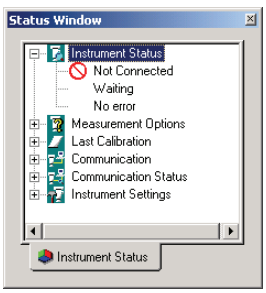


Disconnecting from the spectrophotometer or the chroma meter

1. Select *Instrument* - *Disconnect* from the menu bar.

   The SpectraMagic NX software is disconnected from the instrument and the status of the instrument is displayed in the status window. Once the instrument is disconnected, *Connect* appears in the Instrument menu instead of *Disconnect*.





If the connection fails

If the connection cannot be established, a dialog box appears displaying the messages “No response from instrument” followed by “Connection failed. Retry after changing communication setup.” The Serial Port Settings dialog box then appears.
Specify the communication parameters in the Serial Port Settings dialog box and click the OK button. The system will attempt to reestablish connection.
If the connection fails again, check the following: The instrument and PC are securely connected with a cable; the Bluetooth® adapter is securely attached and the Bluetooth® adapter's driver software is active (if the CM-700d/600d is connected through Bluetooth®); the instrument is turned on; and the instrument is set to remote communication mode. Also, 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, select Connect again.
For details, see “Instrument preparations” in the Navigation Window.

Problems occurring during connection

Connection problems may occur even after the SpectraMagic NX software has successfully connected to the instrument and established proper communication. In the case, a dialog box opens and displays “No response from instrument.” Click OK and check the following: The cable is securely connected; and the Bluetooth® adapter is securely attached and the Bluetooth® adapter's driver software is active (if the CM-700d/600d is connected through Bluetooth®). After checking them, cycle the power of the instrument (turn the power OFF, then back ON), and select Connect again.
If the CM-700d/600d is connected through Bluetooth® communication and communication is interrupted due to surrounding radio wave conditions, SpectraMagic NX attempts to recover the connection. Consequently, when the radio wave conditions improve, the connection is automatically established again.

When the connected instrument does not have a calibration value

After the instrument is successfully connected for communication and the instrument does not have a specified calibration value, the (White) Calibration Setting dialog box appears. See “Downloading Calibration Data to the Instrument” on page 159 to specify the calibration value.

If you previously exited SpectraMagic NX when the instrument was ready to perform remote measurement

The next time the instrument is successfully connected for communication, it will also be ready to perform remote measurement. If calibration has not been performed, the Zero Calibration and White Calibration dialog boxes appear. Follow the on-screen instructions and perform calibration. If calibration is cancelled, remote measurement is turned off. For details on remote measurement, see pages 92 and 94.

When the CM-3600d or the CM-3630 is connected

When the SpectraMagic NX is started with the CM-3600d for the first time, you need to establish the connection and then set up the CM-3600d using the supplied floppy disk or CD-ROM. The unit driver and white calibration value are installed.
To set up and calibrate the CM-3600d, you must select a user with Administrator privileges when logging on to the computer.

When the CM-512m3A or CM-512m3 is connected

When the SpectraMagic NX is used on a PC connected to the CM-512m3A or CM-512m3, do not press the BREAK key of the CM-512m3A or CM-512m3 to exit remote mode. If you use the SpectraMagic NX on a computer connected to the CM-512m3A or CM-512m3, which is not in remote mode, the CM-512m3A or CM-512m3 may malfunction.

When the CM-700d/600d is connected

When the CM-700d/600d is connected by using Bluetooth® communication, you need to establish the connection between the instrument and computer with the driver software supplied with the Bluetooth® adapter before you can connect to the instrument. For the procedure, refer to the Installation Guide of the SpectraMagic NX software.

When two or more CM-700d/600d units are connected, the specular component mode (SCI, SCE, or SCI+SCE) and measurement area (SAV (3 mm) and MAV (8 mm)) specified for the first-connected instrument (instrument 1) are applied to the other connected instrument(s).

When the instrument operates on batteries

If you attempt communication with the instrument and the power supply voltage applied to the instrument is low, the SpectraMagic NX 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 select Connect again.

When using the PC with power supply control, 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 the SpectraMagic NX software, then disconnect and reconnect the cable, and select Connect again.

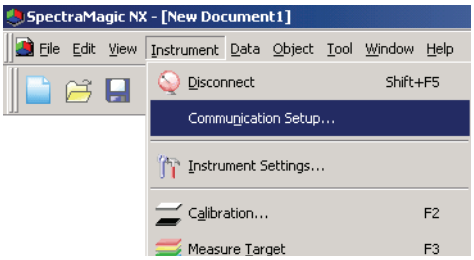
2.1.3 Communication Setting

This procedure is available only when the spectrophotometer or the chroma meter is connected and the protection key is attached to the computer.

The SpectraMagic NX software communicates with the spectrometer or the chroma meter through a serial port. You must specify the operating parameters of the serial port before establishing communication with the instrument.

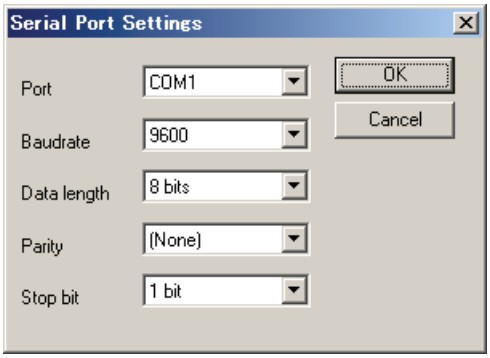
1. Select *Instrument* - *Communication Setup* from the menu bar.

The Serial Port Settings dialog box appears.



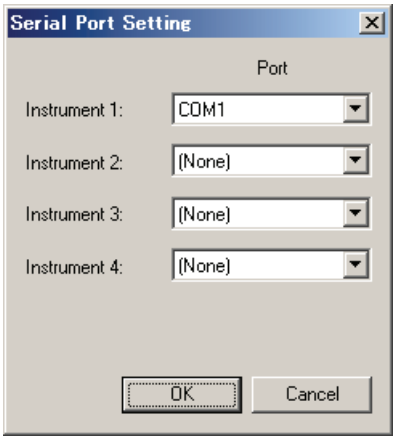
2. Set the operating parameters.

When connecting the CM-700d/600d or CM-5/CR-5, select the COM port number to which the instrument has been assigned. For the procedure to check the COM port number, refer to the Installation Guide.
Select a port that is not being used by any other system or application. Otherwise, the SpectraMagic NX software may not operate properly.
Refer to the instruction manual for your instrument and specify the parameters so that they match the settings of your instrument.



When the CM-700d/600d is connected

Once the communication with the CM-700d/600d is established, the “Serial Port Settings” dialog box shown in step 1 is similar to the one on the below.
Configure the communication settings of the second and later instruments in this dialog.
With the second and later instruments, only the operations of “target remote measurement (page 70)”, “sample remote measurement (page 94)” and “display of the instrument screen for remote measurement (page 195)” are available.

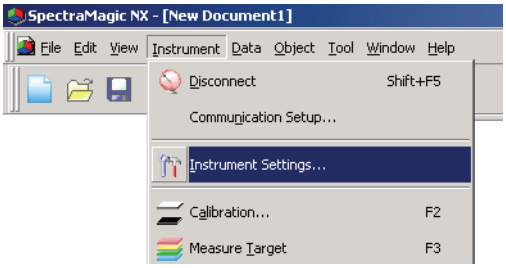


2.1.4 Setting Up the Instrument

This procedure is available only when the spectrophotometer or the chroma meter is connected and the protection key is attached to the computer.

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

The Instrument Settings dialog box appears.

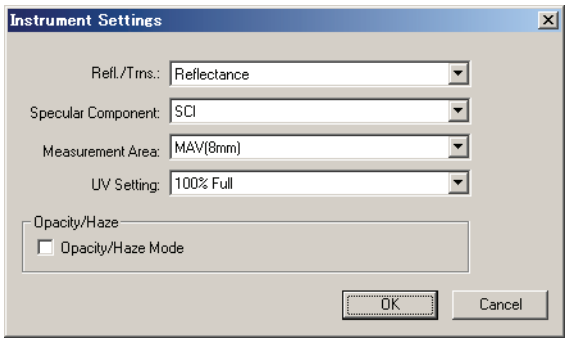


2. Specify the settings of the instrument.

Only those items that can be specified for the instrument are displayed.
When the CM-5 is connected, if you select SCI+SCE in Specular Component, you will run both SCI and SCE measurements by performing a single measuring operation from SpectraMagic NX.
When the CM-3500d is connected, the Target Mask button is displayed. Click the Target Mask button to display the types of target masks attached to the instrument.

To measure opacity or haze, check Opacity/Haze Mode.
(Opacity is supported by the SpectraMagic NX Professional Edition only.)

After the settings are entered, the new settings are displayed in the status window.
For details of instrument settings, refer to the instruction manual for the instrument.



2.2 Calibration

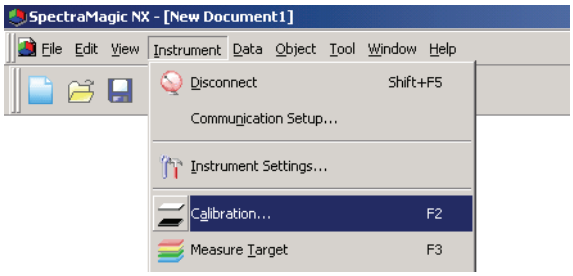
To ensure accurate measurement, you must perform white calibration before every measurement. Moreover, when the spectrophotometer is used for the first time or is reset to its initial status, zero calibration is required.
For an instrument which retains the zero calibration result while the power is turned off, you do not have to perform zero calibration every time the instrument is turned on.
White calibration, however, must be performed every time the instrument is turned on. The optional Zero Calibration Box allows more reliable zero calibration because it is not affected by the surrounding environment.
For transmittance measurement, Zero Calibration and White Calibration are displayed as 0% Calibration and 100% Calibration respectively.

2.2.1 Calibrating the Instrument

This procedure is available only when the spectrophotometer or the chroma meter is connected and the protection key is attached to the computer.

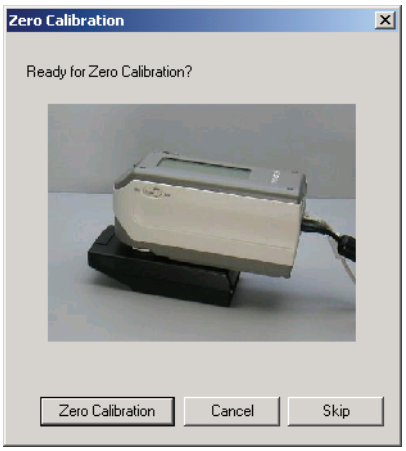
1. Select *Instrument* - *Calibration* from the menu bar.

The Zero Calibration dialog box appears.
If the CR-400 chroma meter, which doesn't have a zero calibration function, is connected, the White Calibration dialog box appears instead. Go to step 3.



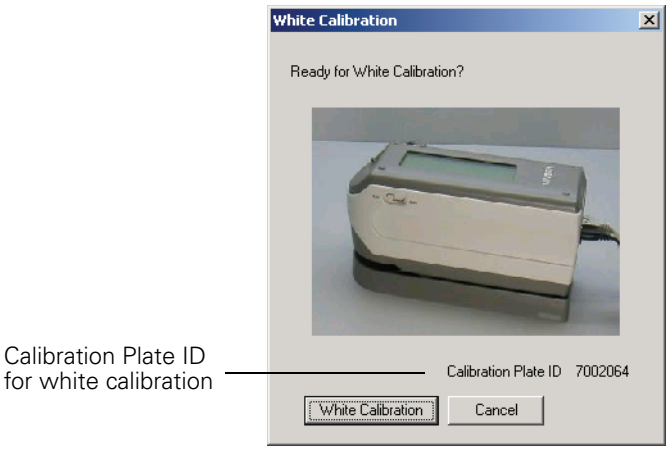
2. Click the Zero Calibration button and perform zero calibration.

When zero calibration is completed, the White Calibration dialog box appears.
If you click the Skip button instead of the Zero Calibration button, 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.



3. Click the White Calibration button and perform white calibration.

White calibration is performed.



Two methods for performing 100% calibration for transmittance measurements are possible:

- 100% calibration to air:
  When the specimen to be measured is in sheet or solid form, 100% calibration should be performed with the transmittance chamber empty.
- 100% calibration to water:
  When the specimen to be measured is in liquid form and will be measured using a cell, 100% calibration should be performed using distilled (or pure) water in the same size and type cell as will be used for measurements.

■ Calibration time displayed in the status window

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

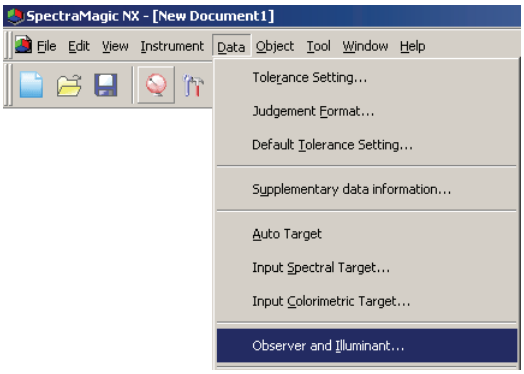
2.3 Preparing for Measurement

2.3.1 Setting the Observer and Illuminant

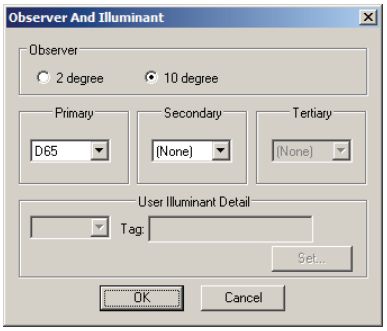
The observer and illuminant are important items required for converting spectral data into colorimetric data. The observer and illuminant must be identical to allow for comparison of colorimetric data from several samples. It is recommended that the observer and illuminant be specified beforehand. They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

1. Select *Data* - *Observer and Illuminant* from the menu bar.

The Observer And Illuminant dialog box appears.



2. Specify the observer and illuminant.



Only one pair of observer and illuminant can be specified for each document file. This setting does not affect the observer and illuminant that have been specified with the instrument.
If the connected instrument is the CR Series, specify the observer and illuminant to match the observer and illuminant set for 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

Observer

Select either 2 degree or 10 degree.

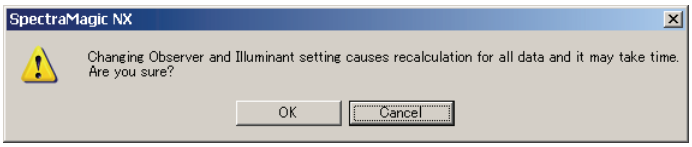
Primary, Secondary, Tertiary

Select illuminant from None, A, C, D_{50}, D_{55}Ⓟ, D_{65}, D_{75}Ⓟ, F_2, F_6Ⓟ, F_7Ⓟ, F_8Ⓟ, F_{10}Ⓟ, F_{11}, F_{12}Ⓟ, U_{50}Ⓟ, ID_{50}Ⓟ, ID_{65}Ⓟ, User 1Ⓟ, User 2Ⓟ or User 3Ⓟ
(Items marked with Ⓟ are supported only by SpectraMagic NX Professional Edition.)
None can be selected only for the secondary and tertiary illuminants.

When selecting one of User 1 to 3, specify the user illuminant data file to be used. When the Set button is clicked, the Input illuminant data dialog is displayed. Ⓟ

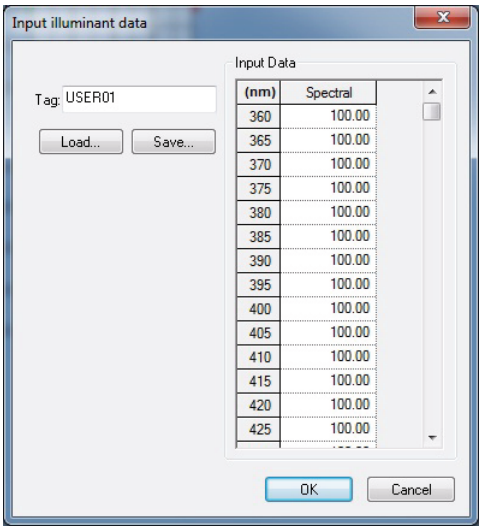
Ⓟ The user illuminant function is supported by SpectraMagic NX Professional Edition only.

The setting in this dialog box will be reflected in all data included in the document file.
When the observer or illuminant is changed, the SpectraMagic NX software recalculates all data.
When you attempt to change the observer or illuminant, the following message appears.



■ Input illuminant data dialog box

Ⓟ This function is supported by SpectraMagic NX Professional Edition only.



Tag

A tag of 60 characters or less can be specified for the illuminant data.

Load

The specified file (extension: .lr5) is loaded and reflected on the input data. After the file is loaded, the name of the file is automatically shown in the Tag field.

Save

The file is saved using the specified file path. The file extension is ".lr5".

Input Data

The spectral data is displayed. You can edit the data by manually entering values directly.

2.3.2 UV Adjustment Ⓟ

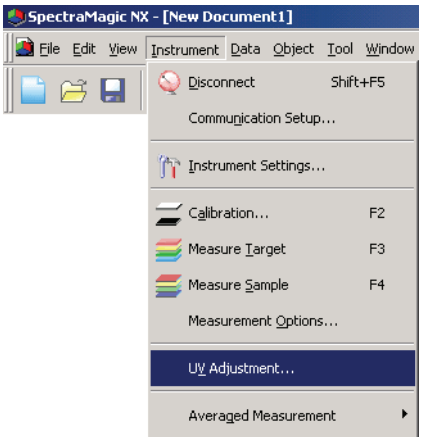
This procedure is available only when the CM-3700A, CM-3600A, CM-3610A, CM-3700d, CM-3600d, CM-3610d, CM-3630 or the CM-2600d is connected and the protection key is attached to the computer.

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

To perform UV adjustment, you must select a user with Administrator privileges when logging on to the computer.

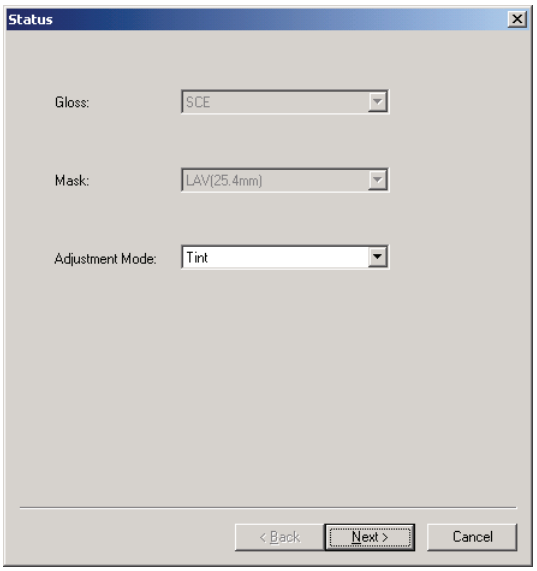
1. Select *Instrument* - *UV Adjustment* from the menu bar.

This option can be selected only when the measurement method is set to “Reflectance”.
When the CM-2600d is used, this option can be selected only when the UV setting is set to “UV adjust” or “100% Full + 400nm cut + UV adjust”.
The Status dialog box appears, showing the parameters of “Gloss”, “Mask”, and “UV Setting” depending on the connected instrument.



2. Select the Adjustment Mode and click the Next button.

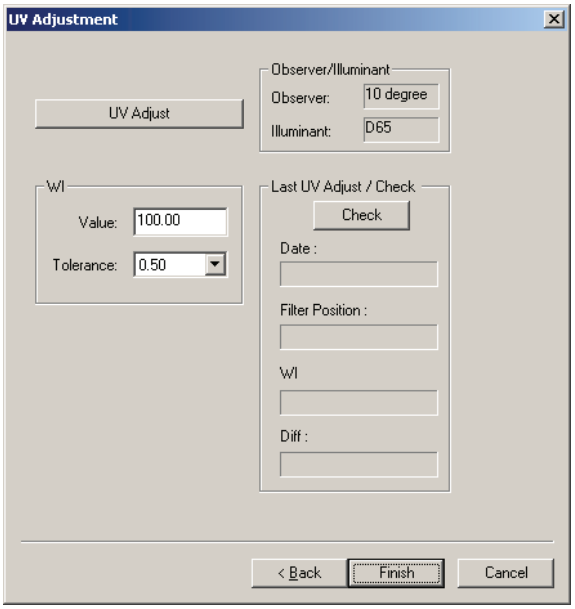
Items selectable for “Adjustment Mode” vary depending on the connected instrument.
A dialog box for the UV adjustment setting is displayed.



3. Specify the parameters of the UV adjustment.

■ UV Adjustment dialog box (Connected instrument: CM-3700A or CM-3700d)

When "WI" is selected for "Adjustment Mode" in the Status dialog box



Observer/Illuminant

The observer and illuminant used for calculation are displayed.
"Observer" is set to 10° and "Illuminant" is set to D_{65}.

WI

Select "Value" from 40 to 250 and "Tolerance" from 0.20, 0.30, 0.50, 1.00, 2.00, and 3.00.

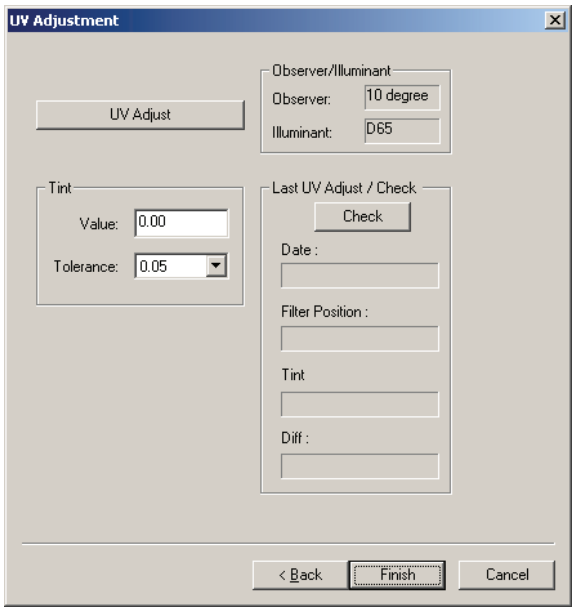
Last UV Adjust / Check

The data for the current settings after the last adjustment is displayed. When the Check button is clicked, the current value is measured and calculated using the filter position of the last adjustment. The obtained value is compared to the current setting value, and the filter position is set to the position of the last adjustment.

UV Adjust

Clicking this button begins the UV adjustment.

When "Tint" is selected for "Adjustment Mode" in the Status dialog box



Observer/Illuminant

The observer and illuminant used for calculation are displayed.
"Observer" is set to 10° and "Illuminant" is set to D_{65}.

Tint

Select "Value" from -6 to 6 and "Tolerance" from 0.05, 0.10, and 0.30.

Last UV Adjust / Check

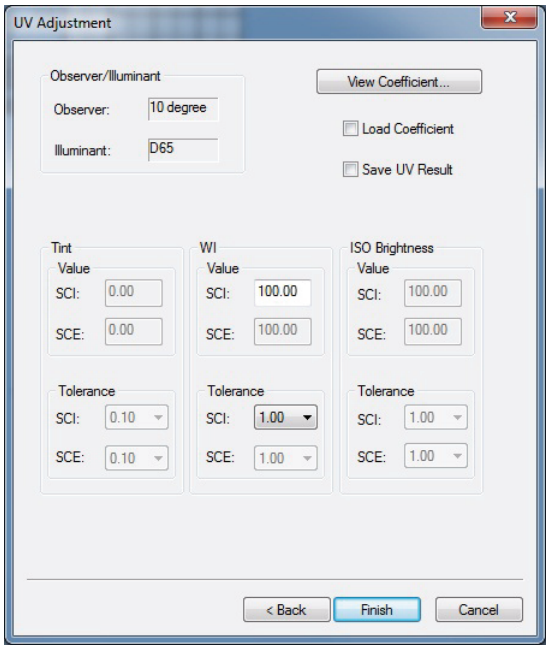
The data for the current settings after the last adjustment is displayed. When the Check button is clicked, the current value is measured and calculated using the filter position of the last adjustment. The obtained value is compared to the current setting value, and the filter position is set to the position of the last adjustment.

UV Adjust

Clicking this button begins the UV adjustment.

■ UV Adjustment dialog box (Connected instrument: CM-3600A, CM-3610A, CM-3600d, CM-3610d, CM-3630 or CM-2600d)

When "Tint", "WI", "Tint & WI" or "ISO Brightness" is selected for "Adjustment Mode" in the Status dialog box



Observer/Illuminant

The observer and illuminant used for calculation are displayed.
"Observer" is set to 10° and "Illuminant" is set to D_{65}.

Load Coefficient

When this option is checked and Finish button is clicked, coefficient data are loaded from the file to complete UV adjustment without performing measurements.
The file extension is "*.krd".

Tint

Select "Value" from -6 to 6 and "Tolerance" from 0.05, 0.10, and 0.30.

WI

Select "Value" from 40 to 250 and "Tolerance" from 0.50, 1.00, and 3.00.

ISO Brightness

Select "Value" from 40 to 250 and "Tolerance" from 0.50, 1.00, and 3.00.

When "SCI" has been set, only a value for "SCI" can be selected. When "SCI+SCE" or "SCE" has been set, values for both "SCI" and "SCE" can be selected.

Save UV Result

When this option is checked, a dialog box is displayed for saving the coefficient after the UV adjustment.

View Coefficient

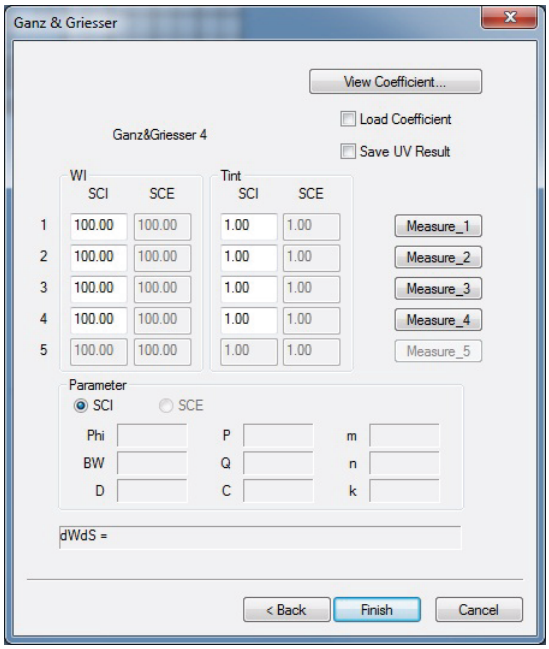
The coefficient obtained by the UV adjustment is displayed.

Finish

Confirms the settings, and performs the UV adjustment.

■ Ganz & Griesser dialog box (Connected instrument: CM-3600A, CM-3610A, CM-3600d, CM-3610d, CM-3630, or CM-2600d)

When "Ganz&Griesser4" or "Ganz&Griesser5" is selected for "Adjustment Mode" in the Status dialog box



Load Coefficient

When this option is checked and Finish button is clicked, coefficient data are loaded from the file to complete UV adjustment without performing measurements.
The file extension is "*.krd".

WI

Select the values from 40 to 250.

Tint

Select the values from -6 to 6.

Parameter

The values of parameters Phi, BW, D, P, Q, C, m, n and k are displayed.

When "SCI" has been set, only values for "SCI" can be selected. When "SCI+SCE" or "SCE" has been set, values for both "SCI" and "SCE" can be selected.

Save UV Result

When this option is checked, a dialog box is displayed for saving the coefficient after the UV adjustment.

View Coefficient

The coefficient obtained by the UV adjustment is displayed.

Measure_1 to 5

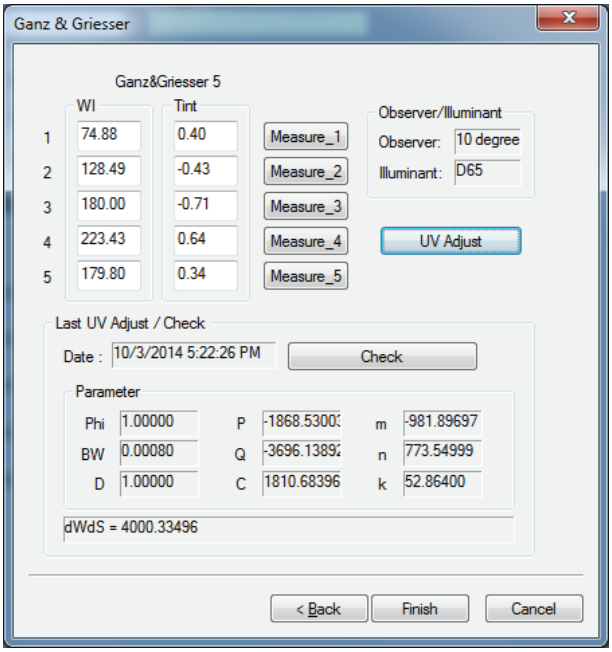
Measurement is performed by using the index value corresponding to the number.

Finish

Confirms the settings, and performs the UV adjustment.

■ Ganz & Griesser dialog box (Connected instrument: CM-3700A or CM-3700d)

When "Ganz&Griesser4" or "Ganz&Griesser5" is selected for "Adjustment Mode" in the Status dialog box



WI

Select the values from 40 to 250.

Tint

Select the values from -6 to 6.

Parameter

The values of parameters Phi, BW, D, P, Q, C, m, n and k are displayed.

Measure_1 to 5

Measurement is performed by using the index value corresponding to the number.

UV Adjust

Performs UV adjustment. (The button will be enabled when Measure_1 to Measure_4 or Measure_5 have been completed.)

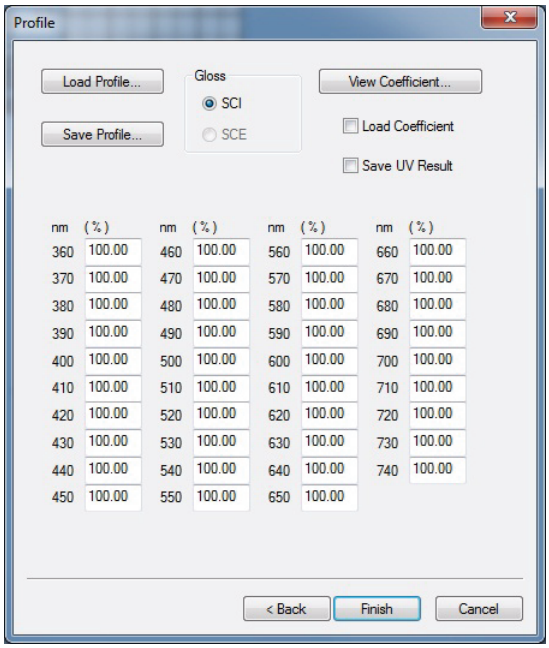
Last UV Adjust / Check

When the Check button is pressed, the date / time of the last Ganz & Griesser UV adjustment and the parameters obtained at that time will be shown.

When Ganz & Griesser UV adjustment is performed using the CM-3700A or CM-3700d, for a single sample or target data 2 measurements are taken with the UV filter moved between the 2 measurements, so approximately 25 seconds is required for each sample or target data.

■ Edit UV Profile dialog box (Connected instrument: CM-3600A, CM-3610A, CM-3600d, CM-3610d, CM-3630 or CM-2600d)

When "Profile" is selected in the Status dialog box



Load

The profile data is loaded from the file and is reflected in the dialog box.
The file extension is "*.pri" for SCI and "*.pre" for SCE.

Save

The items specified in the dialog box are saved in a file.
The file extension is "*.pri" for SCI and "*.pre" for SCE.

Gloss

The data to be edited can be changed.
When "SCI" has been set, only values for "SCI" can be selected. When "SCI+SCE" or "SCE" has been set, values for both "SCI" and "SCE" can be selected.

Load Coefficient

When this option is checked and Finish button is clicked, coefficient data are loaded from the file to complete UV adjustment without performing measurements.
The file extension is "*.krd".

Save UV Result

When this option is checked, a dialog box is displayed for saving the coefficient after the UV adjustment is displayed.

View Coefficient

The coefficient obtained by the UV adjustment is displayed.

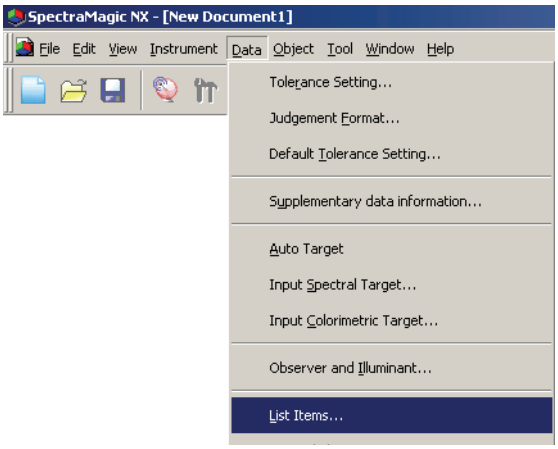
Finish

Confirms the settings, and performs the UV adjustment.

2.3.3 Setting the List Items

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

1. Select *Data* - *List Items* from the menu bar.
The List Items dialog box appears.

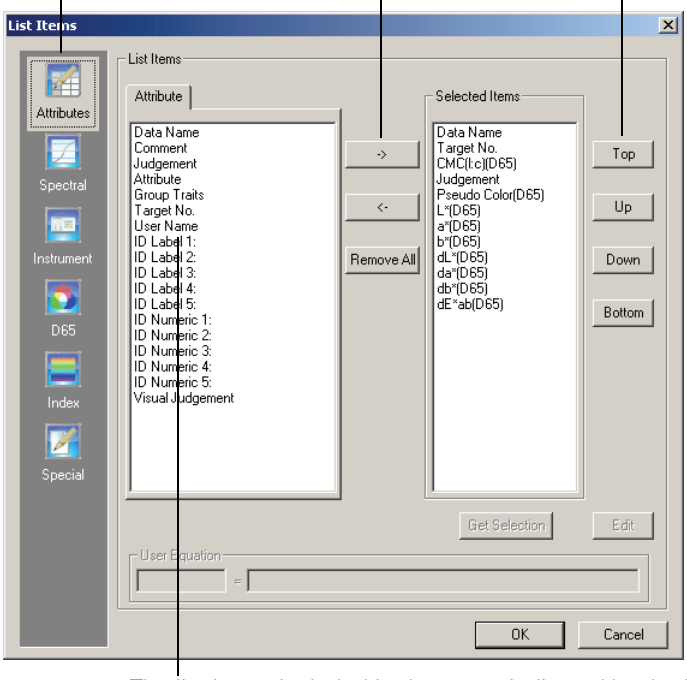


2. Specify the details of the items shown in the list window.

These icons indicate the groups into which the list items are to be classified.

Select an item in the left pane and click the → button to add the item to the Selected Items pane on the right.
To delete an item from the Selected Items, select the item and click the ← button.

You can change the order in which the items are displayed in the list window. The item at the top of this pane is displayed at the left side of the list window. To change the order, select the item in the Selected Items and click the appropriate button.



The list items included in the group indicated by the icon on the left are displayed.

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

■ List Items dialog box

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

Notes for items marked [*1] to [*12] are shown on pages 52 to 54.

		Content displayed in list window
Attributes 	**Data Name**	Name of data
	Comment	Comment
	Judgement	"Pass" or "Fail" (Available only for sample data. The string can be changed.)
	Attribute	"Measured spectral data", "Manually input spectral data", "Manually input colorimetric data"
	Group Traits	"SCI" or "SCE" "UV100" or "UV0" "White" or "Black" (for two banks) "25 degree", "45 degree" or "75 degree" "UV100", "UV0" or "UVadj" (for three banks) None (for one bank) * See page 57 for details on bank setting.
	Target No.	No. assigned to linked target
	Parameter	Parameters l, c, and h used for calculating the color difference equation (ΔE^*_{94} (CIE 1994), ΔE_{00} (CIE 2000), CMC (l:c))
	User Name	Name of the login user (Applicable only when the security function is enabled)
	Supplementary data information	Title specified to supplementary data information (See page 65.)
	Visual Judgement	Result of the visual judgement

		Content displayed in list window
Spectral value 	**360 to 740 nm**	Spectral reflectance, Spectral reflectance difference, K/S Val, K/S Val difference, Absorbance for selected wavelength, Absorbance difference for selected wavelength

		Content displayed in list window	
Instrument 	**Instrument Name**	CM-3700A, CM-3700A-U, CM-3600A, CM-3610A, CM-3700d, CM-3600d, CM-3610d, CM-3630, CM-3500d, CM-2600d, CM-2500d, CM-2500c, CM-700d, CM-600d, CM-512m3A, CM-512m3, CM-5, CR-5, CR-400/410, DP-400	
	Variation	<Function reserved for future use. The current version of SpectraMagic NX shows "----".>	<These contents may not be displayed depending on the instrument being connected.>
	Serial No.	Serial No. of instrument	
	Firmware Version	ROM version of instrument	
	Last Calibration Date & Time	Day and time of the last white calibration	
	Timestamp	Day and time of measurement	
	Measurement Type	Reflectance, Transmittance	
	Geometry	di:8, de:8, di:0, de:0, d:0, 45a:0, multi-angle * A degree symbol (°) is not displayed.	
	Specular Component	SCI, SCE, SCI + SCE	
	Measurement Area	USAV (1 x 3 mm), SAV (3 mm), SAV (3 x 5 mm), SAV (4 mm), MAV (8 mm), 12 mm, 25 mm, LAV (25.4 mm), 30 mm, 50 mm	
	UV Setting	UV adjust, 400 nm cut Normal, 400 nm cut Low, 420 nm cut Normal, 420 nm cut Low, 100% Full + 400 nm cut, 100% Full + 420 nm cut, 100% Full + 400 nm cut + 400 nm cut Normal, 100% Full + 400 nm cut + 400 nm cut Low, 100% Full + 420 nm cut + 420 nm cut Normal, 100% Full + 420 nm cut + 420 nm cut Low, 100% Full + 400 nm cut + UV adjust	
	Observer	2 degree, 10 degree	
	Illuminant 1	A, C, D_{50}, D_{65}, F_2, F_6, F_7, F_8, F_{10}, F_{11}, F_{12}, ID_{50}, ID_{65}	
	Illuminant 2	None, A, C, D_{50}, D_{65}, F_2, F_6, F_7, F_8, F_{10}, F_{11}, F_{12}, ID_{50}, ID_{65}	
	Data Number	Data number specified in the instrument from which the sample data was loaded (when the CM-2600d/2500d, CM-2500c, CM-700d/600d, CM-512m3A, CM-512m3, CM-5/CR-5 or CR-400/410 is connected) "----" (when the CM-3700A, CM-3700A-U, CM-3600A, CM-3610A, CM-3700d, CM-3600d, CM-3610d, CM-3630 or CM-3500d is connected)	
	Comment	Comments set up to the data in the instrument	
	Temperature (CM-512m3)	Temperature value obtained by the temperature detection function (when the CM-512m3 is connected) " ---- " (when an instrument other than CM-512m3 is connected)	
	User Calibration (CM-512m3A)	"ON", "OFF" (when the CM-512m3A is connected) " ---- " (when an instrument other than CM-512m3A is connected)	

D65

Absolute Data	Color Difference	Equation	Others
X Ⓟ	dX Ⓟ	dE*ab	[*3] MI (DIN)
Y Ⓟ	dY Ⓟ	[*1] CMC(l:c) Ⓟ	[*4] Pseudo Color
Z Ⓟ	dZ Ⓟ	[*1] dL-CMC Ⓟ	[*4] Pseudo Color (Target)
L*	dL*	[*1] dC-CMC Ⓟ	[*5] Strength Ⓟ
a*	da*	[*1] dH-CMC Ⓟ	[*5] Strength X Ⓟ
b*	db*	[*1] dE*94(CIE 1994)Ⓟ<dE*94>	[*5] Strength Y Ⓟ
C*	dC*	[*1] dL-dE*94 (CIE 1994)Ⓟ<dL-dE*94>	[*5] Strength Z Ⓟ
h	dH*	[*1] dC-dE*94 (CIE 1994)Ⓟ<dC-dE*94>	[*5] Pseudo Strength Ⓟ
L99	dL99	[*1] dH-dE*94 (CIE 1994)Ⓟ<dH-dE*94>	[*5] Pseudo Strength X Ⓟ
a99	da99	[*1] dE00(CIE 2000)<dE00>	[*5] Pseudo Strength Y Ⓟ
b99	db99	[*1] dL'-dE00 (CIE 2000) <dL'-dE00>	[*5] Pseudo Strength Z Ⓟ
C99	dC99	[*1] dC'-dE00 (CIE 2000) <dC'-dE00>	Dominant Wavelength Ⓟ
h99	dH99	[*1] dH'-dE00 (CIE 2000) <dH'-dE00>	Excitation Purity Ⓟ
x Ⓟ	dx Ⓟ	dEab(Hunter)	[*6] 555 Ⓟ
y Ⓟ	dy Ⓟ	dE99	
u* Ⓟ	du* Ⓟ	FMC2 Ⓟ	
v* Ⓟ	dv* Ⓟ	dL(FMC2) Ⓟ	
u' Ⓟ	du' Ⓟ	dCr-g(FMC2) Ⓟ	
v' Ⓟ	dv' Ⓟ	dCy-b(FMC2) Ⓟ	
L (Hunter)	dL (Hunter)	NBS100 Ⓟ	
a (Hunter)	da (Hunter)	NBS200 Ⓟ	
b (Hunter)	db (Hunter)	dEc (degree) (DIN 6175-2)Ⓟ<dEc (deg.)>	
	[*2] Lightness	dEp (degree) (DIN 6175-2)Ⓟ<dEp (deg.)>	
	[*2] Saturation		
	[*2] Hue		
	[*2] a* Evaluation		
	[*2] b* Evaluation		

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Munsell D65 Hue (JIS Z8721 1993) <Munsell D65 Hue>
Munsell D65 Value (JIS Z8721 1993) <Munsell D65 Value>
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WI(ASTM E313-73)Ⓟ <WI(E313-73)>
WI(Hunter)Ⓟ
WI(TAUBE)Ⓟ
WI(STENSBY)Ⓟ
WI(BERGER)Ⓟ
WI(ASTM E313-96)(C)Ⓟ <WI(E313-96)(C)>
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WI(ASTM E313-96)(D65)Ⓟ <WI(E313-96)(D65)>
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[*7] Brightness (TAPPI T452)Ⓟ <Brightness (TAPPI)>
[*7] Brightness (ISO 2470)Ⓟ < Brightness (ISO)>
[*8] Opacity (ISO2471)Ⓟ
[*8] Opacity (TAPPI T425 89%)Ⓟ <Opacity (T425)>
[*8] Haze (ASTM D1003-97)(A)Ⓟ <Haze (D1003-97)(A)>
[*8] Haze (ASTM D1003-97)(C)Ⓟ <Haze (D1003-97)(C)>
[*7] ISO Status A Density BⓅ <Status A(B)>
[*7] ISO Status A Density GⓅ <Status A(G)>
[*7] ISO Status A Density RⓅ <Status A(R)>
[*7] ISO Status T Density BⓅ <Status T(B)>
[*7] ISO Status T Density GⓅ <Status T(G)>
[*7] ISO Status T Density RⓅ <Status T(R)>
Rx(C)Ⓟ
Rx(D65)Ⓟ
Rx(A)Ⓟ
Ry(C)Ⓟ
Ry(D65)Ⓟ
Ry(A)Ⓟ
Rz(C)Ⓟ
Rz(D65)Ⓟ
Rz(A)Ⓟ
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[*9] Gardner
[*9] Hazen (APHA) colour scale

Index Difference

dWI(CIE 1982)Ⓟ <dWI(CIE)>
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dWI(Hunter)Ⓟ
dWI(TAUBE)Ⓟ
dWI(STENSBY)Ⓟ
dWI(BERGER)Ⓟ
dWI(ASTM E313-96)(C)Ⓟ <dWI(E313-96)(C)>
dWI(ASTM E313-96)(D50)Ⓟ <dWI(E313-96)(D50)>
dWI(ASTM E313-96)(D65)Ⓟ <dWI(E313-96)(D65)>
dWI(Ganz)Ⓟ
Tint diff.(CIE)Ⓟ
Tint diff.(ASTM E313-96)(C)Ⓟ <Tint diff. (E313-96)(C)>
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Tint diff.(ASTM E313-96)(D65)Ⓟ <Tint diff. (E313-96)(D65)>
Tint diff.(Ganz)Ⓟ
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dYI(ASTM E313-73)Ⓟ <dYI(E313-73)>
dYI(ASTM E313-96)(C)Ⓟ <dYI(E313-96)(C)>
dYI(ASTM E313-96)(D65)Ⓟ <dYI(E313-96)(D65)>
dYI(DIN 6167)(C)Ⓟ
dYI(DIN 6167)(D65)Ⓟ
dB(ASTM E313-73)Ⓟ <dB(E313-73)>
[*7] Brightness diff.(TAPPI T452)Ⓟ <Brightness diff. (TAPPI)>
[*7] Brightness diff.(ISO 2470)Ⓟ <Brightness diff. (ISO)>
[*8] Opacity diff.(ISO2471)Ⓟ
[*8] Opacity diff.(TAPPI T425 89%)Ⓟ <Opacity diff.(T425)>
[*8] Haze diff.(ASTM D1003-97)(A)Ⓟ <Haze diff. (D1003-97)(A)>
[*8] Haze diff.(ASTM D1003-97)(C)Ⓟ <Haze diff. (D1003-97)(C)>
[*7] ISO Status A Density diff. BⓅ <Status A diff. (B)>
[*7] ISO Status A Density diff. GⓅ <Status A diff. (G)>
[*7] ISO Status A Density diff. RⓅ <Status A diff. (R)>
[*7] ISO Status T Density diff. BⓅ <Status T diff. (B)>
[*7] ISO Status T Density diff. GⓅ <Status T diff. (G)>
[*7] ISO Status T Density diff. RⓅ <Status T diff. (R)>
dRx(C)Ⓟ
dRx(D65)Ⓟ
dRx(A)Ⓟ
dRy(C)Ⓟ
dRy(D65)Ⓟ
dRy(A)Ⓟ
dRz(C)Ⓟ
dRz(D65)Ⓟ
dRz(A)Ⓟ
Std. Depth diff. (ISO 105.A06)Ⓟ <Std. Depth diff.>
Stain Test (ISO 105.A04E)(C)Ⓟ <Stain Test (C)>
Stain Test (ISO 105.A04E)(D65)Ⓟ <Stain Test (D65)>
Stain Test Rating (ISO 105.A04E) (C)Ⓟ <Stain Test Rating (C)>
Stain Test Rating (ISO 105.A04E) (D65)Ⓟ <Stain Test Rating (D65)>
Grey Scale (ISO 105.A05)(C)Ⓟ <Grey Scale (C)>
Grey Scale (ISO 105.A05)(D65)Ⓟ <Grey Scale (D65)>
Grey Scale Rating (ISO 105.A05)(C)Ⓟ <Grey Scale Rating (C)>
Grey Scale Rating (ISO 105.A05)(D65)Ⓟ <Grey Scale Rating (D65)>

	[*9] Iodine color number	K/S Strength (dE)(C)Ⓟ <K/S (dE)(C)>
	[*9] European Pharmacopoeia	K/S Strength (dL)(C)Ⓟ <K/S (dL)(C)>
	European Pharmacopoeia (AUTO)	K/S Strength (dC)(C)Ⓟ <K/S (dC)(C)>
	European Pharmacopoeia (B)	K/S Strength (dH)(C)Ⓟ <K/S (dH)(C)>
	European Pharmacopoeia (BY)	K/S Strength (da)(C)Ⓟ <K/S (da)(C)>
	European Pharmacopoeia (Y)	K/S Strength (db)(C)Ⓟ <K/S (db)(C)>
	European Pharmacopoeia (GY)	K/S Strength (dE)(D65)Ⓟ <K/S (dE)(D65)>
	European Pharmacopoeia (R)	K/S Strength (dL)(D65)Ⓟ <K/S (dL)(D65)>
	[*9] US Pharmacopoeia	K/S Strength (dC)(D65)Ⓟ <K/S (dC)(D65)>
		K/S Strength (dH)(D65)Ⓟ <K/S (dH)(D65)>
		K/S Strength (da)(D65)Ⓟ <K/S (da)(D65)>
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		K/S Strength (Max Abs)Ⓟ <K/S (Max Abs)>
		K/S Strength (Apparent)Ⓟ <K/S (Apparent)>
		K/S Strength (User)Ⓟ <K/S (User)>
		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	Others
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The characters in < > are the abbreviated names used by the SpectraMagic NX.

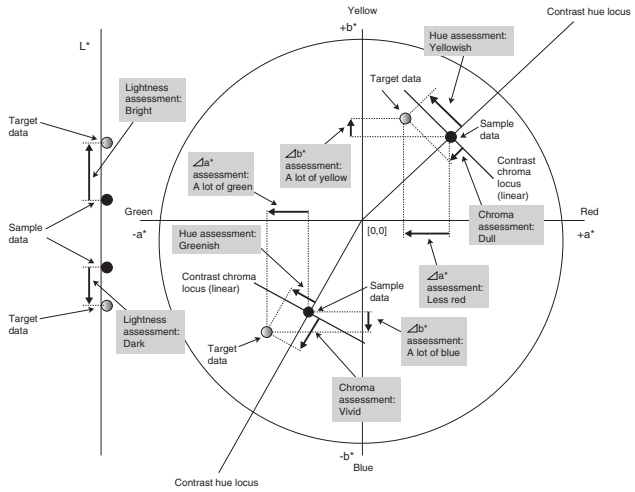
Items marked with Ⓟ are supported only by SpectraMagic NX Professional Edition.

The items x, y, u', v', Δx, Δy, Δu' and Δv' are expressed to four decimal places. Other colorimetric data is expressed to two decimal places.
The number of decimal places can be changed. See page 62 for details.

The SpectraMagic NX software enhances calculation accuracy by performing internal calculations with numbers greater in magnitude 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.
When the number of banks is set to 2, a piece of data is displayed on two lines. When the number of banks is set to 3, a piece of data is displayed on three lines. For details of the banks, see page 57.

[*1] Color difference equation which requires parameter setting. The parameters can be set in the Tolerance Settings dialog box. For details, refer to page 89.

[*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 in the right.



[*3] To add MI, use the Others tab for the secondary or tertiary illuminant. To display the metamerism Others for the illuminant, set the primary illuminant as the reference light.

[*4] Pseudo Color is used to visualize the colorimetric value of the sample data or target data. The cell in the list window is filled with the color. This provides visual feedback on the colorimetric value 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 ΔL*, Δa*, and Δb*.

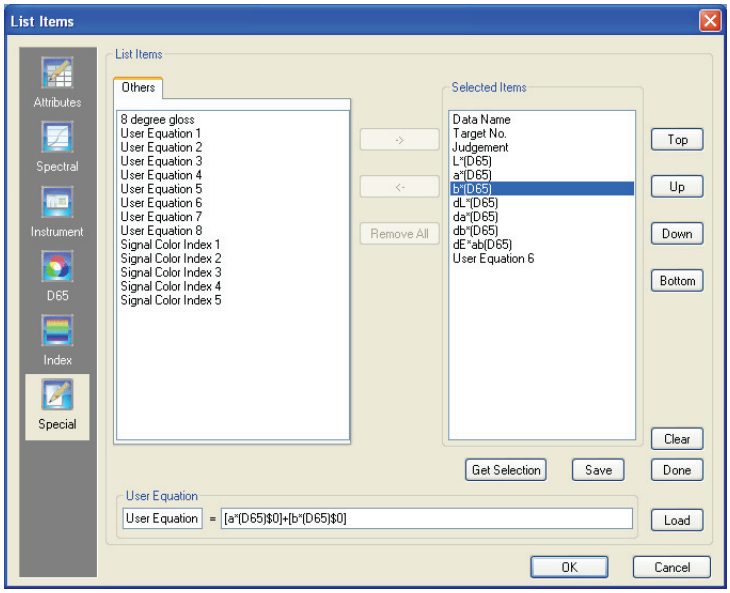
[*7] Brightness and density (ISO Status A, ISO Status T) are not displayed (“---” is displayed instead) when sample data and target data include colorimetric values only.

[*8] Opacity and haze are displayed only when the opacity measurement mode or haze measurement mode are specified respectively.

[*9] The transmittance indices are displayed only when the CM-5/CR-5 is connected and measurement is performed. The values to be displayed are not the transmittance indices calculated from the spectral transmittance by SpectraMagic NX, but those are loaded from the CM-5/CR-5.

[*10] The item “8 degree gloss” is displayed in the list window only when the specular component is set to SCI + SCE.

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



Select the user equation moved in the Selected Items pane and click the Edit button. The user equation input box at the bottom is enabled, 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: *.ued) by clicking the Save button or loaded from a file by clicking the Load button.

The colorimetric data that can be used in a user equation are the data shown in the Selected Items pane above. Select the item in the pane and click the Get Selection button. (The Get Selection button is not enabled when you select an item that cannot comprise a user equation.)

Example: To input "$\sqrt{\Delta L^{*2}+\Delta a^{*2}+\Delta b^{*2}}$"

1) Type "SQRT(".
2) Select "ΔL*" from Selected Items.
3) Click the Get Selection button.
4) Type "**2+".
5) Select "Δa*" from Selected Items.
6) Click the Get Selection button.
7) Type "**2+".
8) Select "Δb*" from Selected Items.
9) Click the Get Selection button.
10) Type "**2)".

Operation when "L*" is selected:

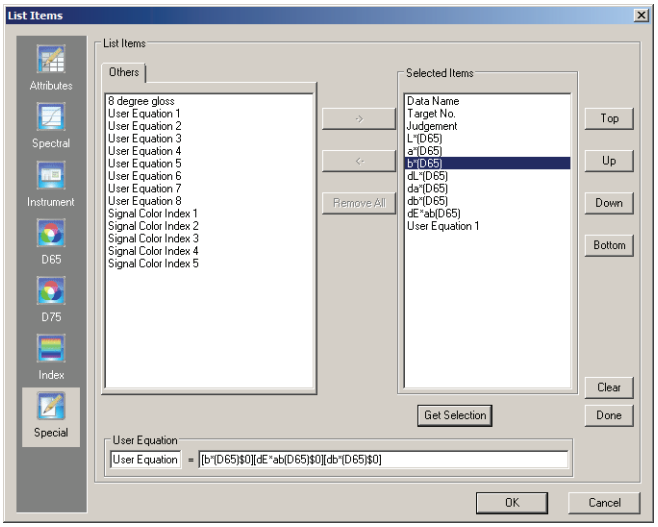
[L*(D65)$0] is displayed in the text input box. The section between [and] indicates the list item. If these symbols ([ ]) are deleted, the SpectraMagic NX software cannot recognize the list item. A user equation that does not include a list item is not effective.

String "$0" indicates the group attribute of the data. Enter the appropriate value according to the group attribute.

Group attribute	String
None	$0
SCI	$SCI
SCE	$SCE
25 degree	$25D
45 degree	$45D
75 degree	$75D
UV100	$UVF
UV0	$UVC
UVadj	$UVA
White	$WHT
Black	$BLK

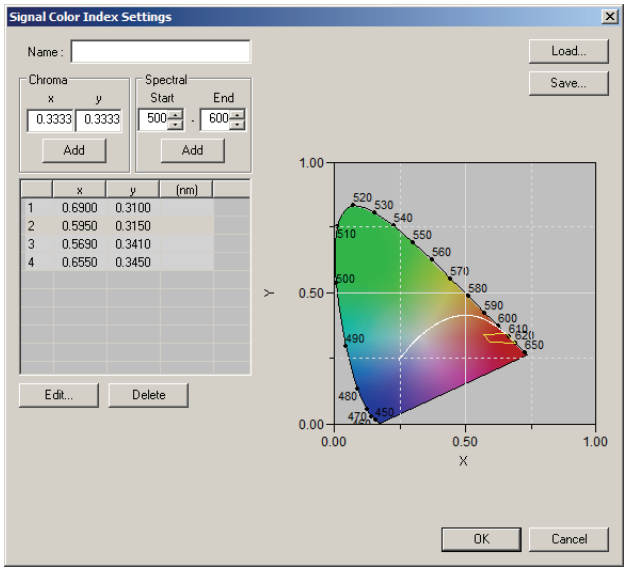
After inputting the user equation in the text input box, click the Done button.

[*12] After a signal color index is added, it can be specified in the follwing procedure.



Select the signal color index moved in the Selected Items pane and click the Edit button.
The Signal Color Index Settings dialog box appears. You can set the polygonal tolerance data here.

■ Signal Color Index Settings



Name

Up to 64 alphanumeric characters can be entered. If no name is specified, the user-defined tolerance data setting cannot be completed.

Chroma

Enter a chromaticity point to add. A numerical value between 0.0001 and 1.0 can be entered or selected.

Add

When this button is clicked, the chromaticity point is added to the data list.

Spectral

Specify data to add as a spectral locus. A wavelength between 380 and 780 can be entered or selected.

Add

When this button is clicked, the wavelengths specified at Start and End are added to the data list as dominant wavelengths, and the intersection of the wavelengths and the spectral locus are added to the data list as chromaticity points.

Delete

When the registered data in the data list is selected and this button is clicked, the data is deleted.

Edit

When one of the items of registered data in the data list is selected and this button is clicked, the Edit dialog box appears to allow you to edit the data.

Load

If any tolerance data has been saved, the file (extension: .otr) can be loaded and the setting displayed on the screen.

Save

When this button is clicked, the setting is saved in a file (extension: .otr).

The format when displaying the signal color index judgement result in the list is set on the Signal Color Index tab located on the List Format dialog box that is displayed by selecting *Data* - *Judgement Format* on the menu bar.

■ List Format dialog box

Signal Color Index tab

Inside

Label: Sets the string displayed in the list window when the result is judged as inside for the signal color index.

Text Color: Sets the text color for the above label displayed in the list window when the result is judged as inside.

Background: Sets the background color for the above label displayed in the list window when the result is judged as inside.

Outside

Label: Sets the string displayed in the list window when the result is judged as outside for the signal color index.

Text Color: Sets the text color for the above label displayed in the list window when the result is judged as outside.

Background: Sets the background color for the above label displayed in the list window when the result is judged as outside.

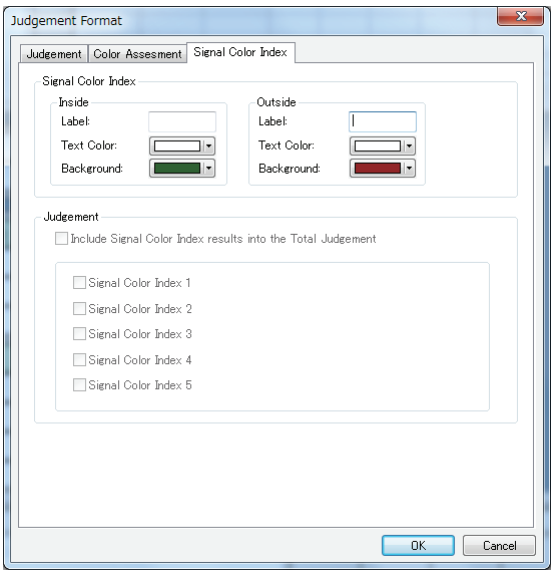
Judgement

Include Signal Color Index results into the Total Judgement:

When this is checked, the results for Signal Color Index items included in the list window affects the total judgement result.

Signal Color Index 1 to 5:

The results for the checked items will affect the total judgement result.



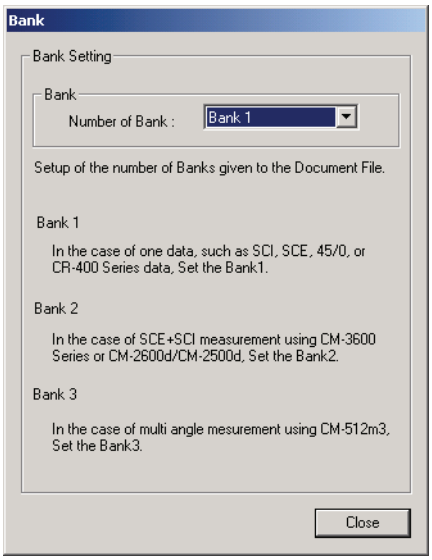
2.3.4 Bank Setting

The data obtained by the simultaneous measurement of SCI+SCE with any of the CM-3600A, CM-3610A, CM-3600d, CM-3610d, CM-5, CM-2600d/2500d or CM-700d/600d requires two spaces (banks) of the data obtained by the individual SCI or SCE specular component treatment.

The data obtained with the CM-3600A, CM-3610A, CM-3600d, CM-3630 or CM-2600d by simultaneous measurement using the UV100% + UV0% + UV adjustment requires spaces (banks) for three pieces of data. Such data is called “data of three banks”. (Measurement using UV adjustment is supported by the Professional Edition only.)
When the CM-512m3A or CM-512m3 is used for measurement, the data of multi-angles (25 degree, 45 degree, and 75 degree) is also obtained. Consequently, such data requires three spaces (banks) and is called “data of three banks”.

A single data file can store only the data of the same number of banks.
A single data file also can store only the data of the same type. For example, a data file of two banks can store the data of SCI + SCE, or UV100% + UV 0% or Opacity. A data file of three banks can store the data of multi-angles (25 degrees, 45 degrees, 75 degrees) or UV100% + UV0% + UV adjustment.
During measurement, the number of banks for the file is determined based on the number of banks of the sample data. If you enter target data manually before measurement, you need to specify the number of banks in the Bank dialog box.

■ Bank dialog box



Number of bank:
Select the number of banks from 1, 2 or 3.

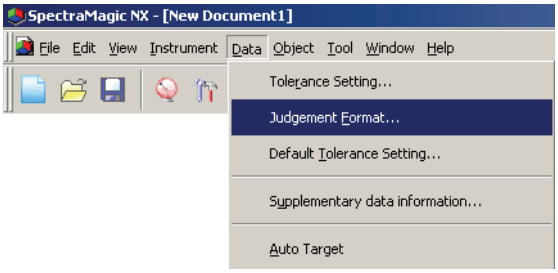
This dialog box can be displayed by selecting *File* - *Property* from the menu bar.

To customers upgrading to Ver. 1.3 of the SpectraMagic NX from a former version

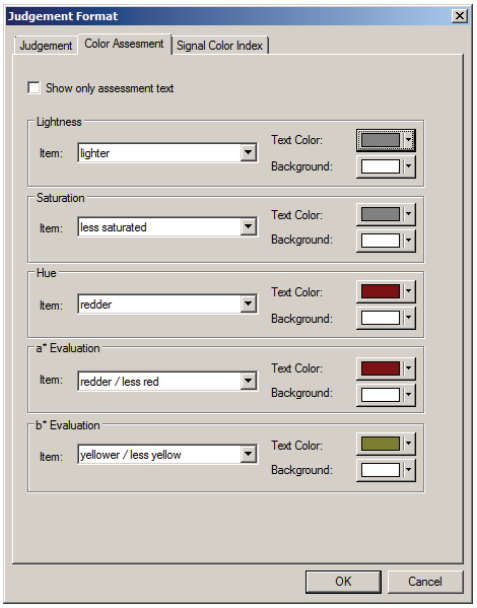
With Ver. 1.3, group attributes are not displayed when the number of banks is specified as one. When a data file created with a former version is opened with Ver. 1.3, the existing group attribute is displayed. When data is added with Ver. 1.3, however, the group attribute for the data is not displayed.

2.3.5 Setting the Assessment Format shown in the List

1. Select *Data* - *Judgement Format* from the menu bar.
   The List Format dialog box appears.



2. Select the Color Assessment Tab and specify the parameters of the assessment format.



■ List Format dialog box

Color Assessment tab

Show only assessment text

When this option is checked, only the assessment text is displayed.

Lightness

lighter

Text Color: Specify the text color of the lightness assessment result shown in the list window when the color is bright.

Background: Specify the background color of the lightness assessment result shown in the list window when the color is bright.

darker

Text Color: Specify the text color of the lightness assessment result shown in the list window when the color is dark.

Background: Specify the background color of the lightness assessment result shown in the list window when the color is dark.

Saturation

less saturated

Text Color: Specify the text color of the chroma assessment result shown in the list window when the color is dull.

Background: Specify the background color of the chroma assessment result shown in the list window when the color is dull.

more saturated

Text Color: Specify the text color of the chroma assessment result shown in the list window when the color is vivid.

Background: Specify the background color of the chroma assessment result shown in the list window when the color is vivid.

Hue

redder

Text Color: Specify the text color of the hue assessment result shown in the list window when the color is reddish.

Background: Specify the background color of the hue assessment result shown in the list window when the color is reddish.

yellower

Text Color: Specify the text color of the hue assessment result shown in the list window when the color is yellowish.

Background: Specify the background color of the hue assessment result shown in the list window when the color is yellowish.

greener

Text Color: Specify the text color of the hue assessment result shown in the list window when the color is greenish.

Background: Specify the background color of the hue assessment result shown in the list window when the color is greenish.

bluer

Text Color: Specify the text color of the hue assessment result shown in the list window when the color is bluish.

Background: Specify the background color of the hue assessment result shown in the list window when the color is bluish.

a* Evaluation

redder/less red

Text Color: Specify the text color of the a* evaluation result shown in the list window when the color contains a lot of red or less red.

Background: Specify the background color of the a* evaluation result shown in the list window when the color contains a lot of red or less red.

greener/less green

Text Color: Specify the text color of the a* evaluation result shown in the list window when the color contains a lot of green or less green.

Background: Specify the background color of the a* evaluation result shown in the list window when the color contains a lot of green or less green.

b* Evaluation

yellower/less yellow

Text Color: Specify the text color of the b* evaluation result shown in the list window when the color contains a lot of yellow or less yellow.

Background: Specify the background color of the b* evaluation result shown in the list window when the color contains a lot of yellow or less yellow.

bluer/less blue

Text Color: Specify the text color of the b* evaluation result shown in the list window when the color contains a lot of blue or less blue.

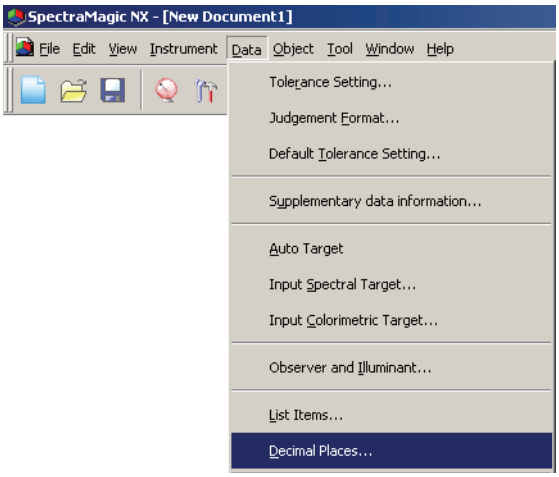
Background: Specify the background color of the b* evaluation result shown in the list window when the color contains a lot of blue or less blue.

2.3.6 Setting the Number of Decimal Places for List Items

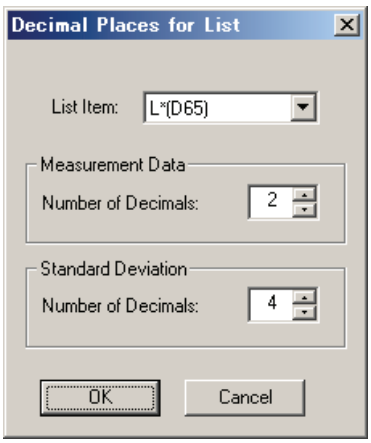
For list items that are represented by numbers, the number of decimal places can be specified individually.

1. Select *Data* - *Decimal Places* from the menu bar.

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

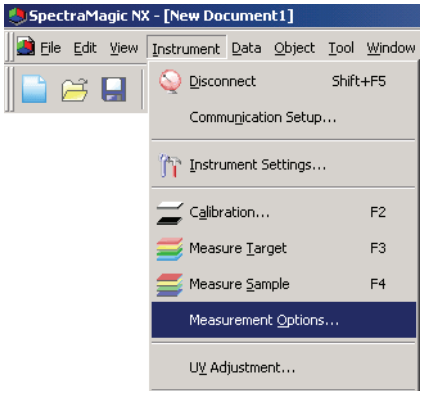
Numerical values between 0 and 8 can be entered or selected.

2.3.7 Setting the Measurement Options

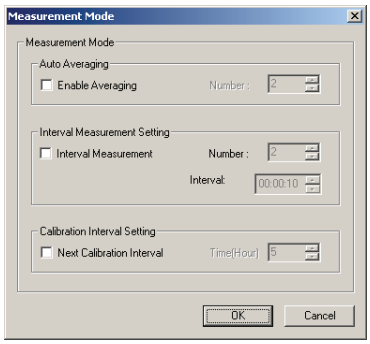
This procedure is available only when the spectrophotometer or the chroma meter is connected and the protection key is attached to the computer.

1. Select *Instrument* - *Measurement Options* from the menu bar.

   The Measurement Mode dialog box appears.



2. Specify the parameters for the auto-averaging measurement and calibration interval.



■ Measurement Mode dialog box

Auto Averaging

Enable Averaging

When this box is checked, the SpectraMagic NX software performs automatic averaging measurement. See page 97 for details of automatic averaging measurement.

This function enables the SpectraMagic NX software to perform automatic averaging measurement without use of the function provided with the instrument. The maximum number of averagings is 1,000.

Interval Measurement Setting Ⓟ

Interval Measurement

When this box is checked, the SpectraMagic NX software performs interval measurement. See page 95 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 10 seconds. Move the cursor onto each of hour/minute/second and specify the value respectively.

Ⓟ This function is supported by the SpectraMagic NX Professional Edition only.

These methods can also be combined. Note, however, that you cannot use interval measurement in connection with manual averaging measurement.

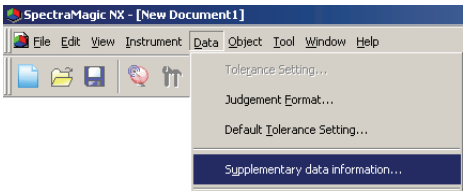
Calibration Interval Setting

Next Calibration Interval

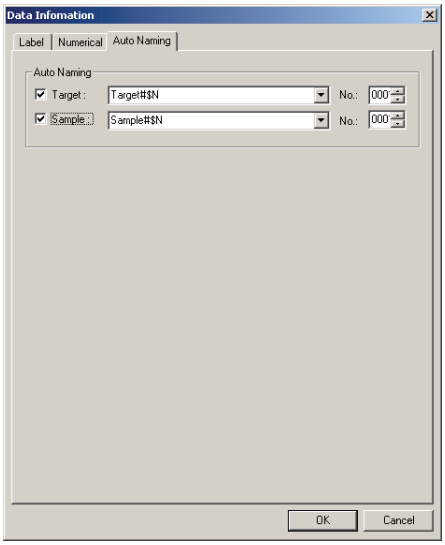
When the time specified here has passed since the last white calibration performed with the SpectraMagic NX software, a message appears to recommend white calibration. Time between 01:00 (1 hour) to 24:00 (24 hours) can be entered.

2.3.8 Setting Auto-naming

1. Select *Data* - *Supplementary data information* from the menu bar.



2. Select the Auto Naming tab and specify the parameters for auto naming.



■ Data information dialog box

Auto Naming

Target

When this box is checked, the name of target data is assigned automatically during measurement.

Sample

When this box is checked, the name of sample data is assigned automatically during measurement.

When this box is checked, data is automatically named during measurement. 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
$N	Automatically created number (serial number) assigned to a sample. (The first number in the series can be specified between 0 and 9999.)
$D	Day of measurement

String	Corresponding data
$M	Month of measurement
$Y	Year of measurement
$h	Hour of measurement
$m	Minute of measurement
$s	Second of measurement

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.

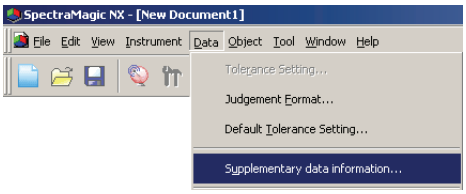
Sample#$N
$D/$M/$Y-$h:$m:$s

2.3.9 Specifying supplementary information of data Ⓟ

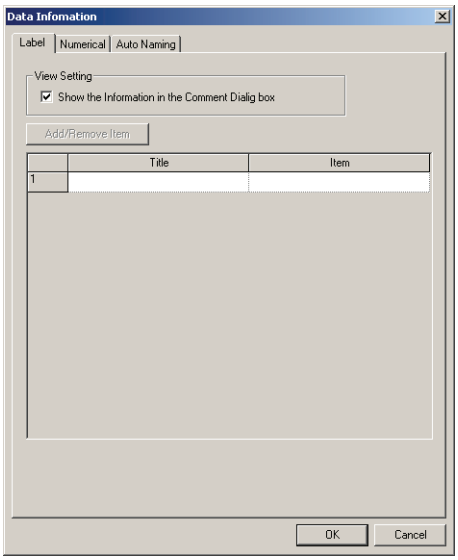
This function is supported by the SpectraMagic NX Professional Edition only.

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 pieces are displayed in the list window as list items.
This setting is recorded for each document file (data file), and it is stored in a template file. For details of a template file, refer to page 132.

1. Select *Data* - *Supplementary data information* from the menu bar.
   The Data Information dialog box appears.



2. Select the Label tab or Numerical tab and specify details for the supplementary information of the data.



■ Data Information dialog box

Label tab, Numerical tab

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

Show the Information in the Comment Dialog box

When this box is checked, supplementary data information is shown in the Name dialog box displayed during measurement.

Title

Enter the title of the supplementary data information in the text box. Up to 30 alphanumeric characters can be used.

You can edit the title that was entered previously. You can also delete a title by selecting the row and pressing the Delete key. Up to 200 titles can be added on the Label and Numerical tabs respectively.

Item

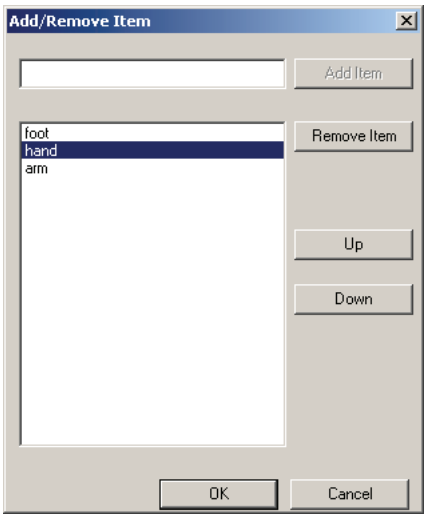
When the Item column of a specified title is selected, the Add/Remove Item button is enabled. Display the Add/Remove Item dialog box by clicking the Add/Remove Item button, and add or delete items.

The items specified in this dialog box are displayed in the list box that appears when supplementary information is specified to each item of data. You can select a desired item from the list box.

Now the items specified in the Add/Remove Item dialog box are displayed in the list box for the Item column.

When you copy data to another document file and supplementary data information has been specified to the data, the title is not copied. The title to be displayed is the one specified in the destination document file, and only the items specified in the source document file are copied.

■ Add/Remove Item dialog box



Adding items

Enter an item to be added in the text box on the left of the Add Item button, and then click the button. The item is displayed at the top of the list box.

You can add as many items as you want by repeating this procedure. The order of the items can be changed by selecting one and clicking the Up or Down button.

Deleting items
Select the item to be deleted in the list box, and then click the Remove Item button.

To use supplementary data information stored in a template file
When a template file (.mtp) storing supplementary data information is reflected to a data file (.mes), the supplementary data information of the data file is overwritten with the supplementary data information of the template file.
If the data file has more supplementary data information than the template file, the excess information is not overwritten. If such supplementary data information has the same name as the information in the template file, a tilde (˜) is suffixed to the title. The number of tildes is not limited as long as titles with the same name exist. (See below.)

Data file (before copying)
Title 1
Title 2
Title 3
Title 4
Title 5
Title 6
Title 7

+

Template file
Title 4
Title 5
Title 6

=

Data file (after copying)
Title 4
Title 5
Title 6
Title 4˜
Title 5˜
Title 6˜
Title 7

2.4 Specifying Target Data/Tolerance

2.4.1 Registering Target Data

Register the target data to be used for color difference measurement. When only absolute values are measured, it is unnecessary to register target data.
The several methods available for registering target data are shown below:

■ **Registering target data by performing a measurement**

Target measurement:
Perform a measurement by triggering the SpectraMagic NX software to take a measurement and obtain the sample data as target data.

Target remote measurement:
Perform measurement by pressing the measuring button of the instrument. The SpectraMagic NX software receives the sample data as target data.
If the CM-700d/600d or CM-5/CR-5 is connected, pressing the measuring button once performs measurement up to the number of auto averagings set on the instrument. If a different instrument is connected, measurement is only performed once.

Target interval measurement: Ⓟ
Start measurement by triggering the SpectraMagic NX software once to take a measurement using the interval time and number of measurements specified in advance. The measured sample data is received as target data after every measurement.
Ⓟ This function is supported by the SpectraMagic NX Professional Edition only.

Target automatic averaging measurement:
Start measurement by triggering the SpectraMagic NX software once to take a measurement. After the specified number of measurements has been performed, the collected sample data is averaged to provide the target data.

Target manual averaging measurement:
Select the target manual averaging measurement mode. Repeat the measurements for the desired number of times and exit the mode. The sample data collected during the period is averaged to provide the target data.

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

■ **Manual data input**

Input data manually from the existing data sheet and use it as the target data.

■ **Uploading target data from the instrument**

Upload the target data stored in the memory of the instrument to the SpectraMagic NX software.

■ **Copying target data from existing data**

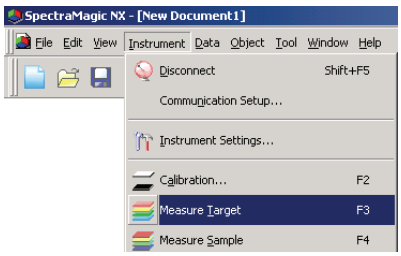
Copy sample data or target data in the same or different document file and use it as the target data.

2.4.1-a Performing Target Measurement

This procedure is available only when the spectrophotometer or the chroma meter is connected and the protection key is attached to the computer.

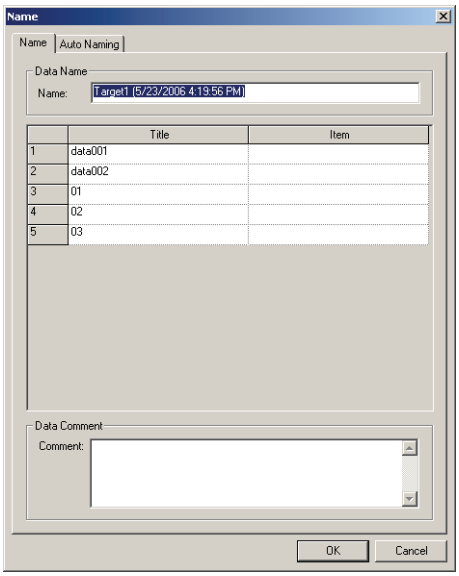
1. Select *Instrument* - *Measure Target* from the menu bar.

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.
To assign a comment to each piece of sample data, select *All Data* - *Target(s)* in the list window after the measurement and choose the data from the displayed data group. Then select *Data* - *Data Property* from the menu bar and type the comment in the displayed dialog box. (See page 103.)



2. Enter the name of the data.

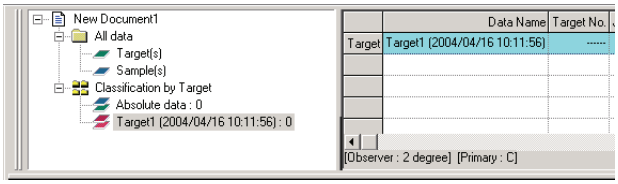
You can assign a name, supplementary data information Ⓟ and a comment for each piece of sample data. (See page 70.)
Select a supplementary data information item every time you measure.
Items marked with Ⓟ are supported only by SpectraMagic NX Professional Edition.



(Sample display of the Professional Edition)

3. Click the OK button.

When the opacity/haze measurement mode is set, measurements using a white background and a black background are conducted in succession.
Data is added to the list window.



■ Name dialog box

Name tab

Data Name

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

Supplementary Data Information Ⓟ

The titles specified on the Label and Numerical tabs of the Data Information dialog box are displayed. (See page 66.)

Enter items in the Item column. If an item has been specified in the Data Information dialog box (see page 66), you can select one from the list box.

Data Comment

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

Auto Naming tab

Auto Naming

Target data can be automatically named during measurement. Specify the format of the name to be automatically assigned. See page 64 for details.

Items marked with Ⓟ are supported only by SpectraMagic NX Professional Edition.

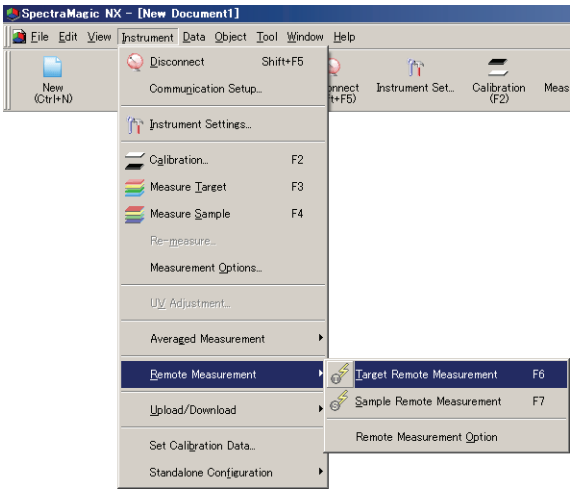
2.4.1-b Performing Target Remote Measurement

This procedure is available only when the spectrophotometer, excluding the CM-3000 Series or the chroma meter is connected and the protection key is attached to the computer.

1. Select *Instrument* - *Remote Measurement* - *Target Remote Measurement* from the menu bar.

   Checking this option enables remote measurement of target data. When this option is selected, the measurement can be triggered either with the measuring button of the instrument or with the measuring command of the SpectraMagic NX software.

   This option cannot be selected in the Opacity/Haze mode.



■ Target Remote Measurement and Sample Remote Measurement

Target Remote Measurement and Sample Remote Measurement cannot be selected simultaneously. If you select Sample Remote Measurement while Target Remote Measurement is checked, Target Remote Measurement will become unchecked and a check mark will appear for Sample Remote Measurement. If you select Sample Remote Measurement again, the check mark disappears and Sample Remote Measurement is deselected.

When the CM-5 is connected

If Specular Component is set to SCI+SCE in Instrument settings, Target Remote Measurement cannot be performed.

When the CM-700d/600d is connected

By setting options in advance, the results of the measurement or pass/fail judgement for the “target remote measurement” and “sample remote measurement” can be displayed on the LCD screen of the instrument. For the procedure of the advance setting, refer to page 195.

When a CM-2600-, CM-512m3-, or CR-400-Series instrument is connected

If the instrument's Communication Mode is canceled and then set again using instrument controls, Target Remote Measurement will be canceled on the instrument. When this occurs, uncheck Target Remote Measurement and then check it again to re-enable Target Remote Measurement.

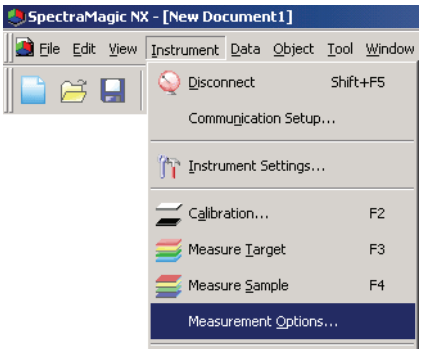
2.4.1-c Performing Target Interval Measurement Ⓟ

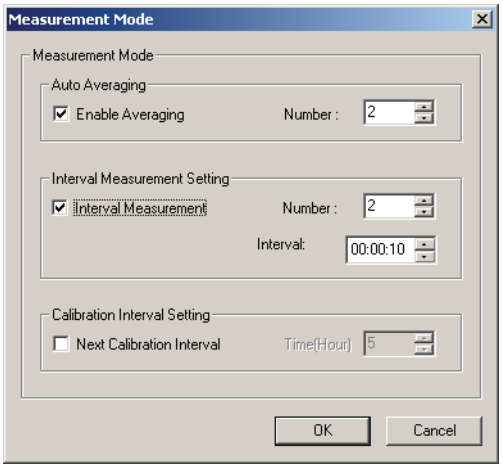
This procedure is available only when the spectrophotometer or the chroma meter is connected and the protection key is attached to the computer.

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

1. Select *Instrument* - *Measurement Options* from the menu bar.

The Measurement Mode dialog box appears.
Check Interval Measurement and specify the options for the interval measurement.
The interval measurement repeats measurement a specified number of times at specified intervals.
The measured sample data is received as target data after every measurement.





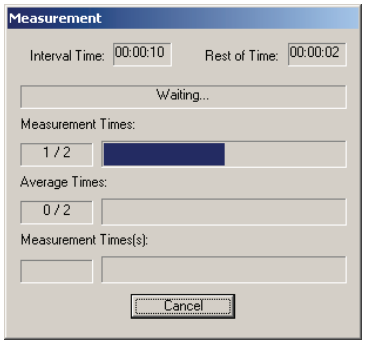
■ Measurement Mode dialog box

See “Measurement Mode dialog box” on page 63.

2. Click the OK button.

3. Perform the measurement described on page 69.

The Measurement dialog box appears and interval measurement is performed.
During interval measurement, data is added to the list window after every measurement.

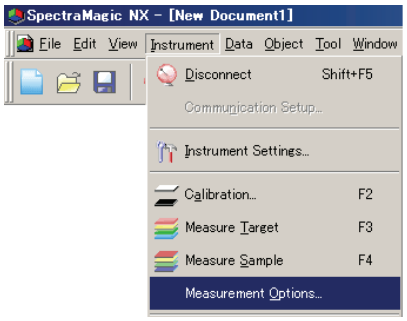


2.4.1-d Performing Target Automatic Averaging Measurement

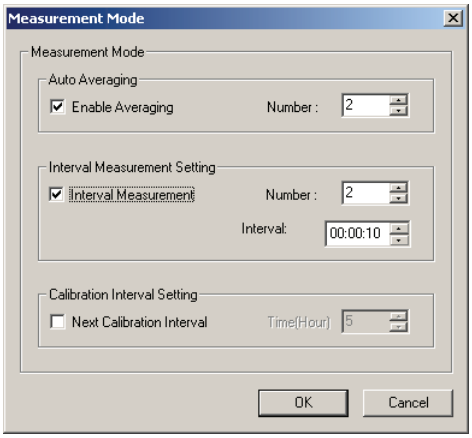
This procedure is available only when the spectrophotometer or the chroma meter is connected and the protection key is attached to the computer.

1. Select *Instrument* - *Measurement Options* from the menu bar.

The Measurement Mode dialog box appears.
Check “Enable Averaging” to enable automatic averaging measurement of target data.



During automatic averaging measurement of target data, the measurement is repeated the specified number of times. When the measurement is completed, the sample data is averaged to provide one piece of target data.



■ Measurement Mode dialog box

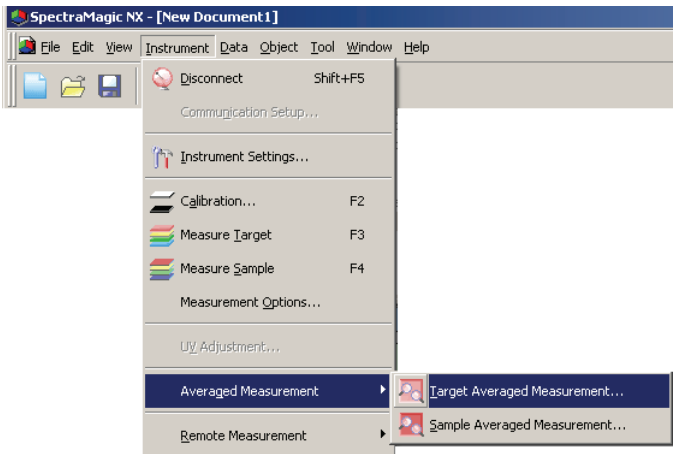
See “Measurement Mode dialog box” on page 63.

2.4.1-e Performing Manual Averaging Measurement

This procedure is available only when the spectrophotometer or the chroma meter is connected and the protection key is attached to the computer.

1. Select *Instrument* - *Averaged Measurement* - *Target Averaged Measurement* from the menu bar.

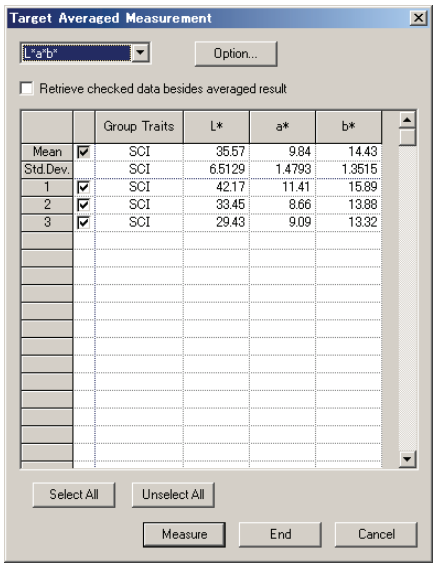
The Target Averaged Measurement dialog box appears.



2. Repeatedly click the Measure button to perform the measurement the desired number of times.

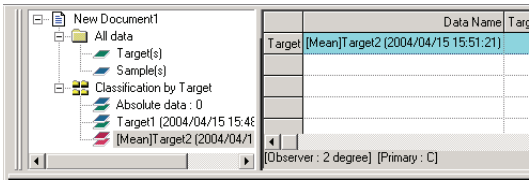
When the opacity/haze measurement mode is set, measurements using a white background and a black background are conducted.
The sample data is displayed in the dialog box.
The average and standard deviation are calculated and displayed for each measurement.
The data with a check mark is used for average calculation.

Uncheck data that you do not want to include in the average calculation, such as abnormal values.



3. Click the OK button.

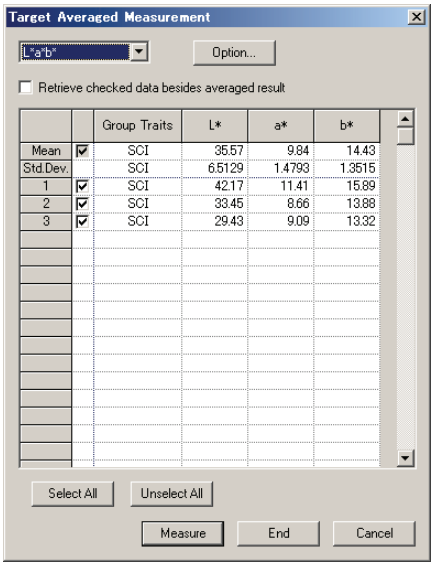
The average is added to the list window as one piece of target data.



■ Target Averaged Measurement dialog box

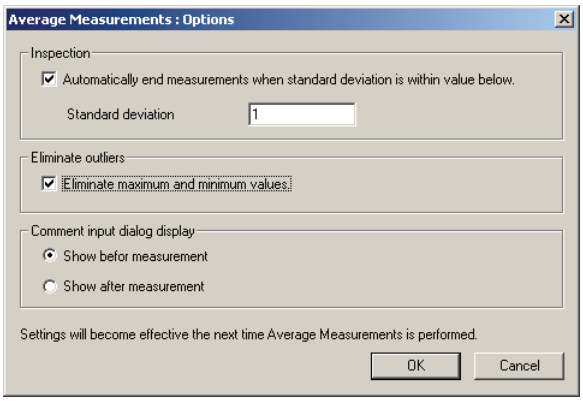
Color space drop-down list box

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 list.



Retrieve checked data besides averaged result
When this option is checked, the data with a check mark is also added to the list window as individual target data.

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, the manual averaging measurement finishes only after the measurement is 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.

Select All
Selects and checks all the sample data.

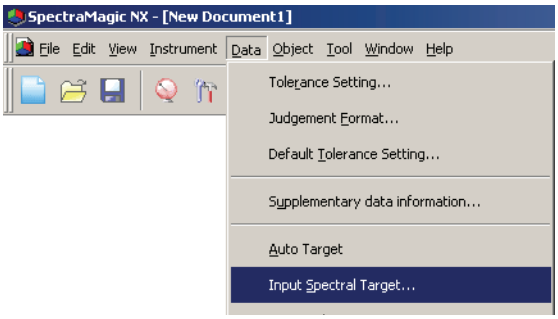
Unselect All
Leaves all the sample data unchecked.

2.4.1-f Registering Target by Manual Data Input

Entering spectral data

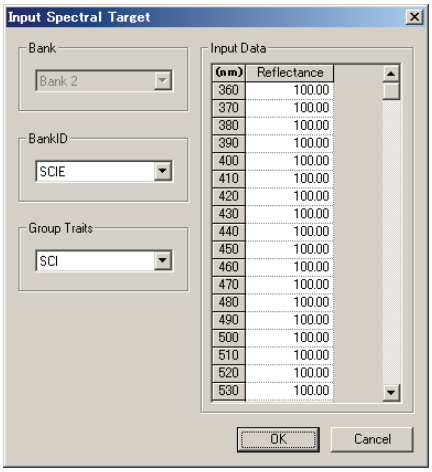
1. Select *Data* - *Input Spectral Target* from the menu bar.

Unless the number of banks has already been set for the file through measurement, the Bank dialog box appears. See page 57 for details on bank setting.
The Input Spectral Target dialog box appears.



2. Type the spectral data.

When Bank is set to 2, select SCIE, UVINOUT, or OPACITY at BANK ID, and select SCI or SCE, UV100 or UV0, or White or Black at Group Traits and specify the tolerance respectively. When Bank is set to 3, select UVADJ or TRIPPLE at Bank ID, and select UV100, UV0 or UVadj, or 25 degree, 45 degree or 75 degree at Group Traits and specify the tolerance respectively.

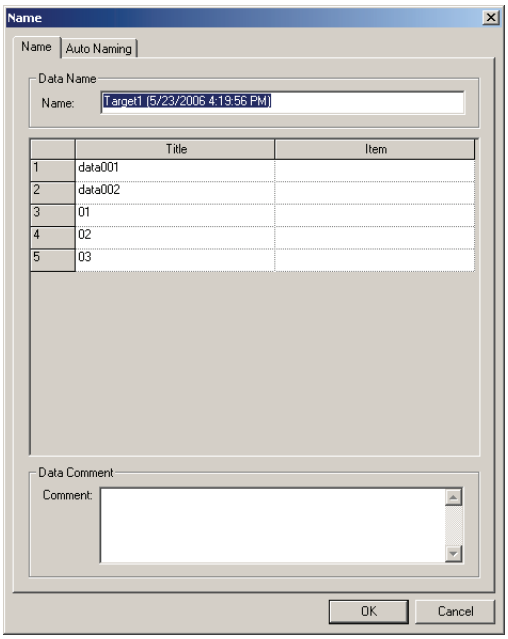


3. Click the OK button.

The Name dialog box appears.
If auto-naming is activated, the Name dialog box does not appear. Skip this process and go to step 5.
To assign a comment, select All Data - Target(s) in the list window after registration and choose the data from the displayed data group. Then select *Data* - *Data Property* from the menu bar and type the comment in the displayed dialog box. (See page 103.)

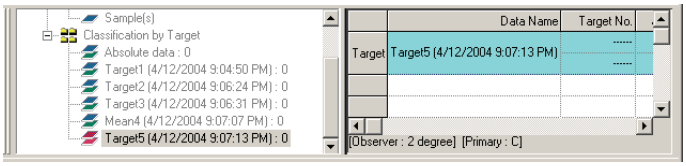
4. Enter the name of the data.

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 NX Professional Edition.



(Sample display of the Professional Edition)

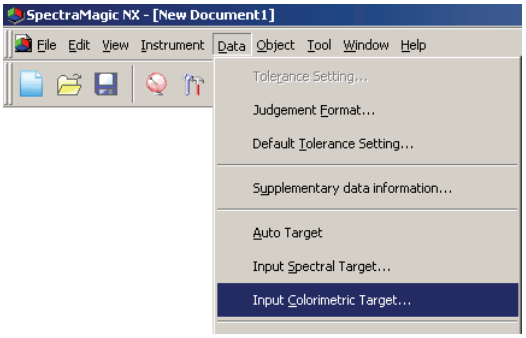
5. The data is added to the list window.



Entering colorimetric data

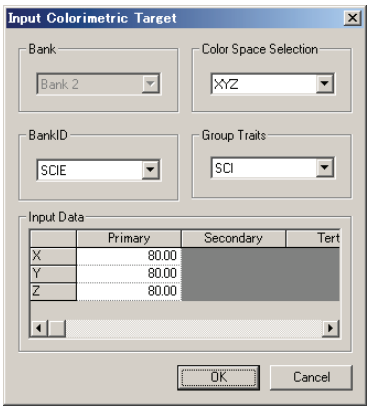
1. Select *Data* - *Input Colorimetric Target* from the menu bar.

Unless the number of banks has already been set during measurement, the Bank dialog box appears. See page 57 for details on bank setting.
The Target Input dialog box appears.



2. Select the color space and type the colorimetric data.

When Bank is set to 2, select SCIE, UVINOUT, or OPACITY at BANK ID, and select SCI or SCE, UV100 or UV0, or White or Black at Group Traits and specify the tolerance respectively. When Bank is set to 3, select UVADJ or TRIPPLE at Bank ID, and select UV100, UV0 or UVadj, or 25 degree, 45 degree or 75 degree at Group Traits and specify the tolerance respectively.

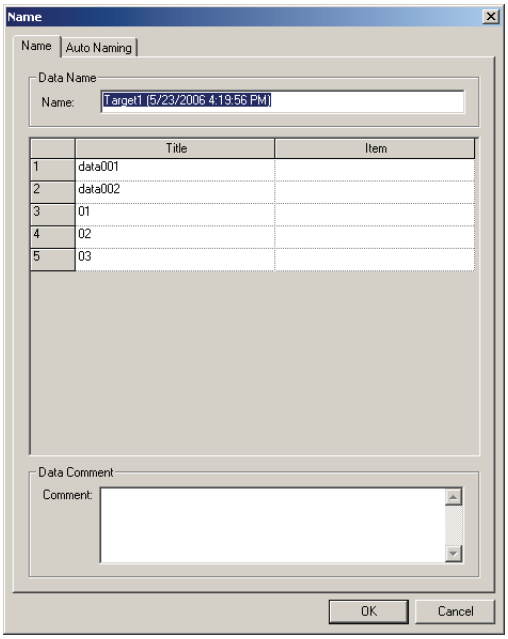


3. Click the OK button.

The Name dialog box appears.
If auto-naming is activated, the Name dialog box does not appear. Skip this process and go to step 5.
To assign a comment, select *Data* - *Data Property* from the menu bar after registration and type the comment in the displayed dialog box. (See page 103.)

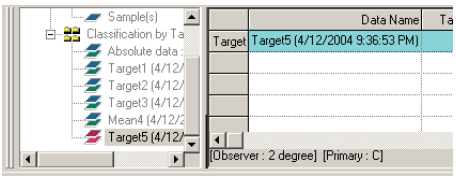
4. Enter the name of the data.

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 NX Professional Edition.



(Sample display of the Professional Edition)

5. The data is added to the list window.



■ Input Colormetric Target dialog box

Color Space Selection

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

Target data of primary/secondary/tertiary illuminant

Type the value of the selected colorimetric data.

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

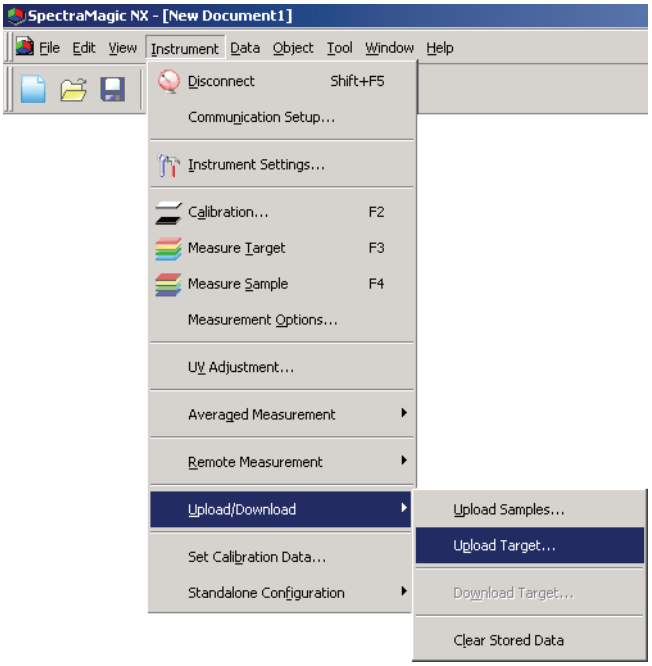
2.4.1-g Uploading Target Data from the Instrument

This procedure is available only when the spectrophotometer, excluding the CM-3000 Series or the chroma meter is connected and the protection key is attached to the computer.

The target data stored in the memory of the instrument can be uploaded to the SpectraMagic NX software.
This operation is disabled when the number of banks is 2 (UV100 + UV0 or Opacity) or 3 (UV100 + UV0 + UVadj).

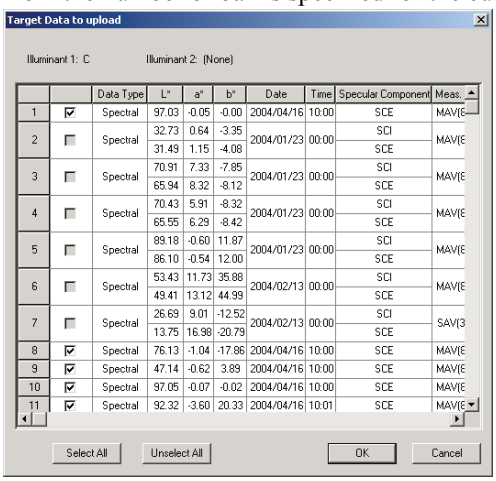
1. Select *Instrument* - *Upload*/*Download* - *Upload Target* from the menu bar.
If the CM-2600d/2500d or CM-700d/600d is connected and if the number of banks has not been set for the file through measurement, the Bank dialog box appears. See page 57 for details on bank setting.

If the CM-2600d/2500d is connected and its ROM version is Ver. 1.21, the Language Environment of Instrument dialog box appears. Specify the display language to be used for the instrument and click the OK button.



2. Uploading starts.

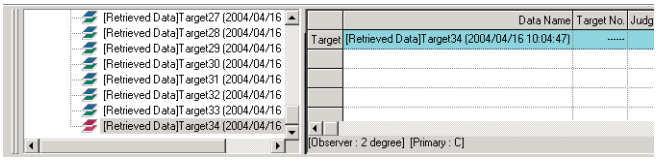
When the CM-2600d/2500d, CM-700d/600d or CM-5/CR-5 is connected, the Target Data to upload dialog box appears. Data with a check mark will be uploaded. Uncheck the unneeded data.
Note that the data cannot be checked when the target data is colorimetric data and when the illuminant and observer settings are different from those currently specified with the SpectraMagic NX software. If the CM-2600d/2500d is connected, data cannot be checked for which the specified number of banks is different from the number of banks specified for the current file.



		Data Type	L*	a*	b*	Date	Time	Specular Component	Meas.
1	☑	Spectral	97.03	-0.05	-0.00	2004/04/16	10:00	SCE	MAV(6
2	☐	Spectral	32.73	0.64	-3.35	2004/01/23	00:00	SCI	MAV(6
			31.49	1.15	-4.08			SCE	
3	☐	Spectral	70.91	7.33	-7.85	2004/01/23	00:00	SCI	MAV(6
			65.94	8.32	-8.12			SCE	
4	☐	Spectral	70.43	5.91	-8.32	2004/01/23	00:00	SCI	MAV(6
			65.55	6.29	-8.42			SCE	
5	☐	Spectral	89.18	-0.60	11.87	2004/01/23	00:00	SCI	MAV(6
			86.10	-0.54	12.00			SCE	
6	☐	Spectral	53.43	11.73	35.88	2004/02/13	00:00	SCI	MAV(6
			49.41	13.12	44.99			SCE	
7	☐	Spectral	26.69	9.01	-12.52	2004/02/13	00:00	SCI	SAV(3
			13.75	16.98	-20.79			SCE	
8	☑	Spectral	76.13	-1.04	-17.86	2004/04/16	10:00	SCE	MAV(6
9	☑	Spectral	47.14	-0.62	3.89	2004/04/16	10:00	SCE	MAV(6
10	☑	Spectral	97.05	-0.07	-0.02	2004/04/16	10:00	SCE	MAV(6
11	☑	Spectral	92.32	-3.60	20.33	2004/04/16	10:01	SCE	MAV(6

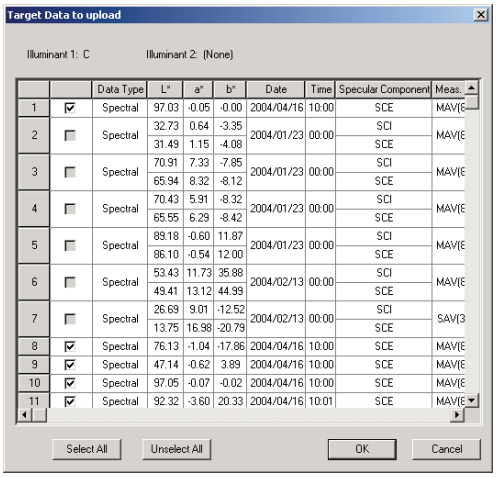
Sample display when the CM-2600d/2500d, CM-700d/600d or CM-5/CR-5 is connected

3. Click the OK button to begin uploading.



■ Target Data to upload dialog box (only when the CM-2600d/2500d, CM-700d/600d or CM-5/CR-5 is connected)

Select All: All sample data check boxes are selected.
Clear All: All sample data check boxes are cleared.



2.4.1-h Copying Target from the Existing Data

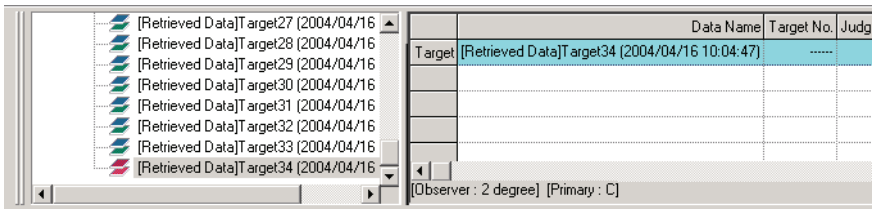
For data copy and paste procedures, see page 112.

2.4.2 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.

2.4.2-a Selecting Specific Target Data

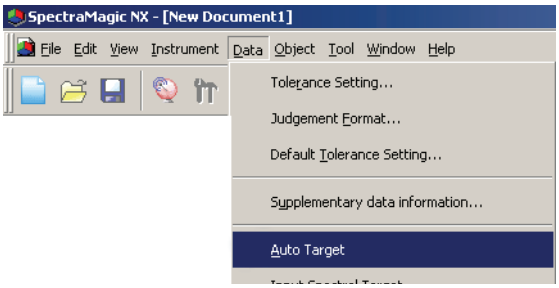
Select the specific target data from the Classification by Target folder in the tree appearing in the list window.



Or, select the specific target data from the Select Target box in the toolbar.
To add the Select Target box to the toolbar, see the procedure on page 125.

2.4.2-b Auto Target

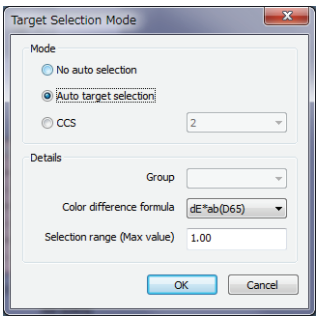
1. Select *Data* - *Auto Target* from the menu bar.



Or, right-click the Classification by Target folder in the tree of the list window and select Auto Target from the displayed context menu.

The Target Selection Mode dialog box appears.

2. In the Mode frame, select Auto target selection and click the OK button.



■ Target Selection Mode dialog box

Details

Group
If the number of banks is set to 2 or 3, you can select group traits to be used for the judgement of the minimum color difference value.

Max Value Ⓟ
Up to 20 limits can be set for the color difference to be used for judgement.
Among all target data, the data with the minimum ΔE*ab or other color difference value within the maximum range specified here is specified as the target data for color difference measurement. If there is no such data, the target data for color difference measurement is not specified, and the sample data will be saved in "Absolute Data" among the folders classified according to target data.
This function is supported by the SpectraMagic NX Professional Edition only.

When Auto target selection is selected, the piece of data with the minimum ΔE*ab or other color difference value (selectable) among all target data after measurement is specified as the target data for color difference measurement.
Application: Simple CCS
It is useful to create a document file of this setting for a database file of target data.
See page 131 for details of document files (data files).

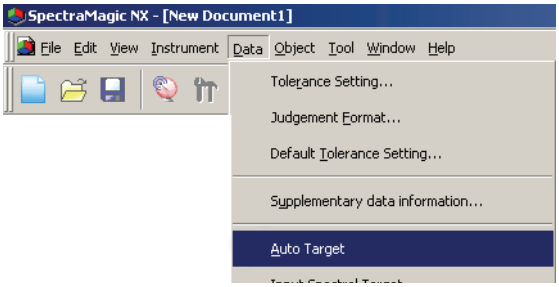
If Bank is set to Bank 2 or Bank 3, you can select group traits to be used for the judgement of the minimum color difference value.

2.4.2-c CCS Ⓟ

This function is supported by the SpectraMagic NX PRofessional Edition only.

To use the CCS, set the CCS condition beforehand.

1. Select *Data-Auto Target* from the menu.



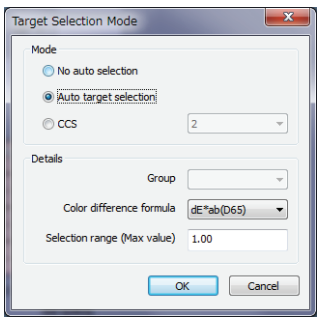
   Or, right-click the Classification by Target folder in the tree of the list window and select Auto Target from the displayed context menu.

   The Target Selection Mode dialog box appears.

2. In the Mode frame, select CCS, specify the number of target data pieces used for the CCS (2 to 10) and click the OK button.

   When the CCS is set, the Closest Color System dialog box appears after the measurement, and the target data pieces of the specified number are displayed in increasing order of color difference for the primary illuminant such as ΔE*a (selectable) among all target data. Select target data used for color difference measurement from these candidates.

■ Target Selection Mode dialog box



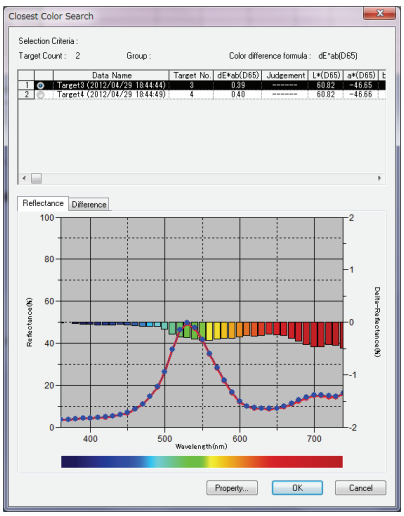
Details

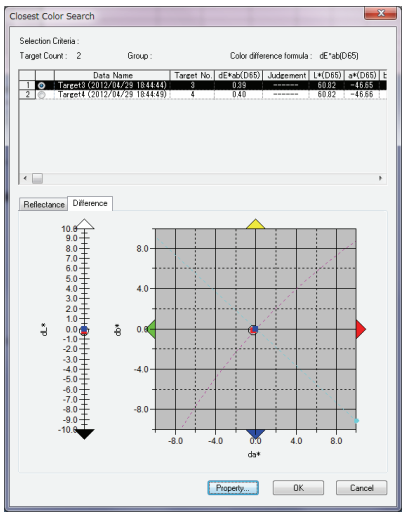
Group
If the number of banks is set to 2 or 3, you can select group traits to be used for the judgement of the minimum color difference value.

Max Value
Up to 20 limits can be set for the color difference to be used for judgement.
It is possible to enter up to 2 digits past the decimal point.
If a 3rd digit is entered, the value will round up or round down accordingly.

Using the CCS

When the CCS has been set and you perform measurement, the following screen is displayed as a list display.



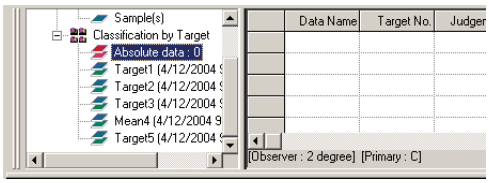


■ **Closest Color Search dialog box**

Among all target data, the target data which satisfies the condition specified in the Target Selection Mode dialog box is displayed in increasing order of color difference.
Select the target data used for color difference measurement from these candidates and click the OK button. The data will be linked to the sample data as the target data for color difference measurement.

2.4.2-d Not Specify Target (Absolute measurement)

Select Classification by Target - Absolute Data in the tree of the list window.



Or, select Absolute Data from the Select Target box in the toolbar.
To add the Select Target box in the toolbar, see the procedure on page 125.

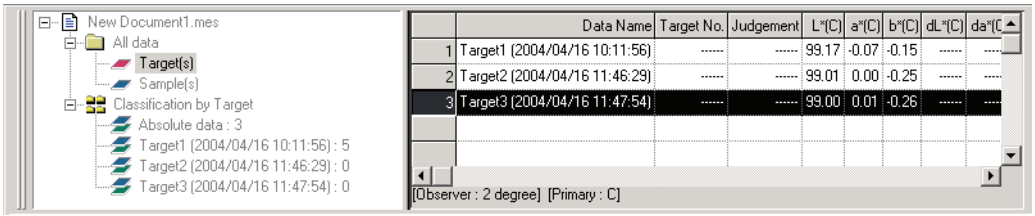
2.4.2-e Specifying Working Target Ⓟ

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

You can organize several pieces of target data in a group and specify all the data pieces as the target data for color difference measurement. A group consists of several pieces of working target data under one piece of master target data. You can perform various evaluations using the group, such as showing the working target data and master target data simultaneously in a color difference graph or absolute graph, or fixing the position of the origin point of the graph at the master target data.

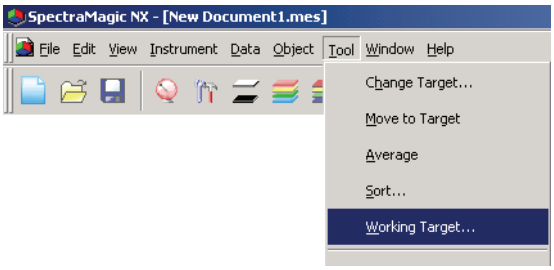
1. From the tree in the list window, select a data group under *All data* - *Sample(s)*, or select the absolute data or target data in the Classification by Target folder. Then, select the sample or target data from the list.

   Target data that has already been specified as a master target cannot be specified as a working target.

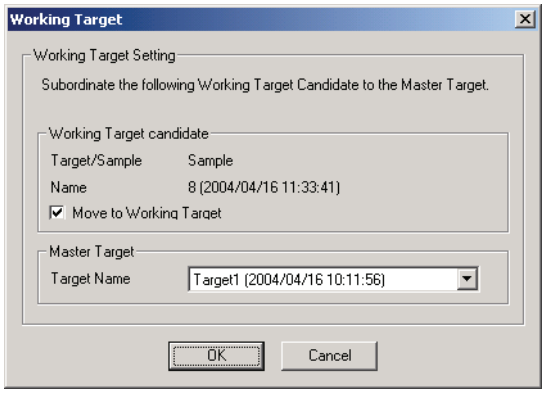


2. Select *Tool* - *Working Target* from the menu bar.

   The Working Target dialog box appears.



3. Specify the necessary items.



■ 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 data to which the selected working target data belongs.

2.4.3 Setting the Tolerance

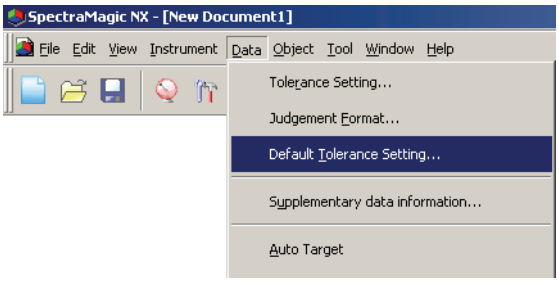
To perform judgement based on color difference measurement, it is necessary to set the tolerance.

2.4.3-a Setting the Initial Tolerance

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

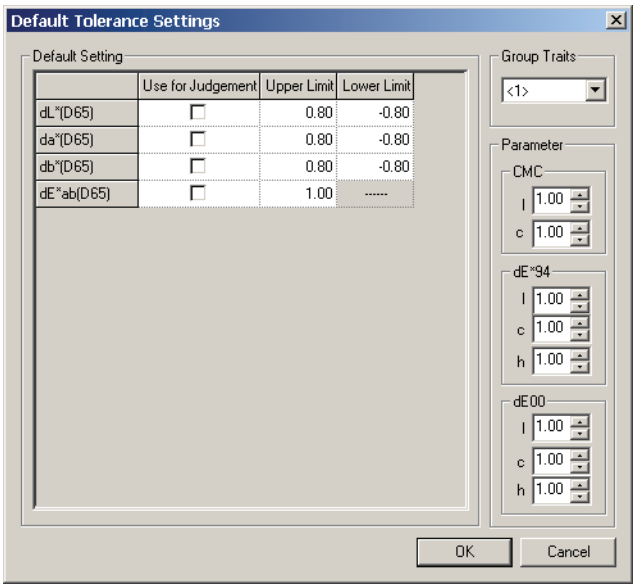
1. Select *Data - Default Tolerance Setting* from the menu bar.

Unless the number of banks has already been set for the file through measurement, the Bank dialog box appears. See page 57 for details on bank setting.
The Default Settings dialog box appears.
The colorimetric data items to be displayed (list items) are the items specified with the procedure in "Setting the List Items" (page 46).



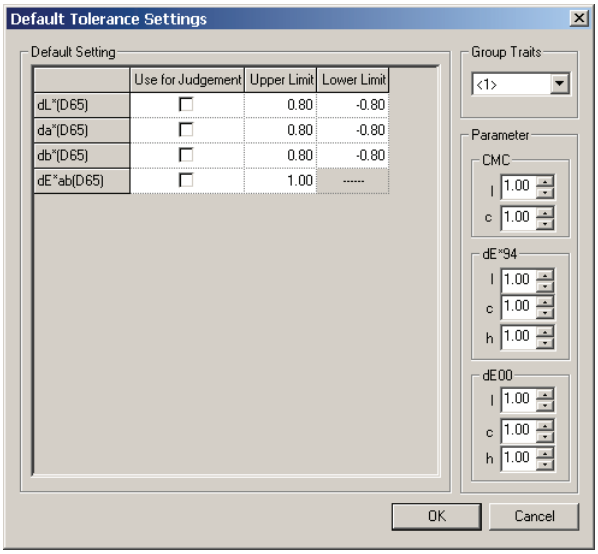
2. Specify the parameters of the tolerance.

When Bank is set to 2, select SCI or SCE, or select UV100% or UV0% at Group Traits and specify the tolerance respectively. When Bank is set to 3, select 25 degree, 45 degree or 75 degree, or select UV100%, UV0% or UVadj at Group Traits and specify the tolerance respectively.
The specified tolerance is applied to newly added target data.



■ Default Tolerance Settings dialog box

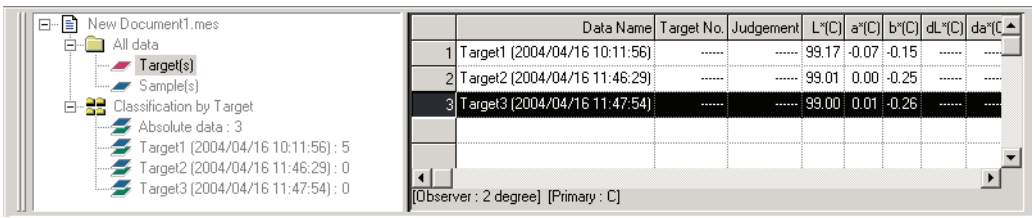
When the check box in the Use for Judgement column is checked, the data is judged with the upper/lower tolerance values. Data boxes left unchecked are not judged.
Numerical values can be edited regardless of the status of the check mark.
The tolerance can be specified for each of colorimetric data items (list items) displayed in the list window.



2.4.3-b Setting the Tolerance for Each Target

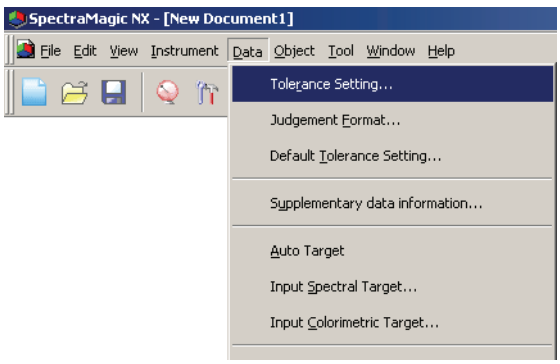
The tolerance specified with the default tolerance setting during the target registration can be changed for each target data.

1. From the tree in the list window, select a data group under *All data* - *Target(s)* and then select the target data from the list.



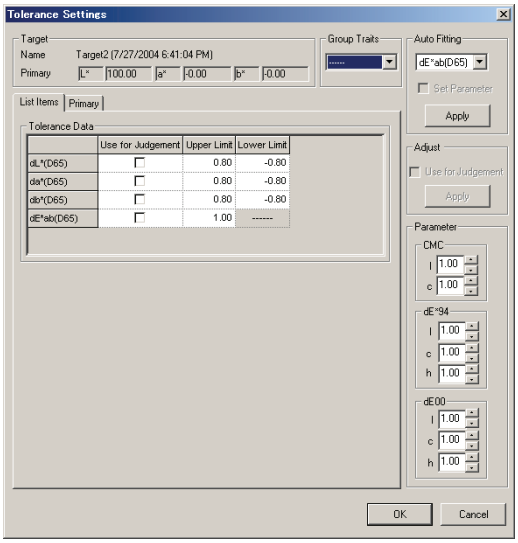
2. Select *Data* - *Tolerance Setting* from the menu bar.

   The Tolerance Setting dialog box appears.



3. Specify the necessary parameters of the tolerance.

When Bank is set to 2, select SCI or SCE, or select UV100% or UV0% at Group Traits. When Bank is set to 3, select 25 degree, 45 degree or 75 degree, or select UV100%, UV0% or UVadj at Group Traits. Then you can specify the tolerance respectively.



■ Tolerance Settings dialog box

Target

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

Auto Fitting Ⓟ

When one of CMC, ΔE*94 and ΔE00 is selected in the list items and sample data exists, the optimum tolerance is automatically adjusted based on the color difference equation.
This automatic adjustment is supported by the SpectraMagic NX Professional Edition only.

Set Parameter

When this option is checked, the parameters are automatically adjusted based on the upper limit specified as the tolerance.
When this option is not checked, the upper limit of the tolerance is automatically adjusted by using the parameters that were already entered.

Apply

When this button is clicked, automatic adjustment begins and the automatically specified values are displayed.
When "Set Parameter" is checked, the parameters are updated. When it is not checked, only the tolerance of the color difference equation is updated.

Adjust Ⓟ

When sample data exists, an optimal ellipse is calculated automatically from the distribution of sample data regardless of the color difference equation. This setting can be used independently from the tolerance setting judged with threshold values.
This automatic adjustment is supported by the SpectraMagic NX Professional Edition only.

Use for Judgement

When this option is checked, judgement is performed based on the result of AND of this selection and the setting in the Use for Judgement column of the Tolerance Data table.

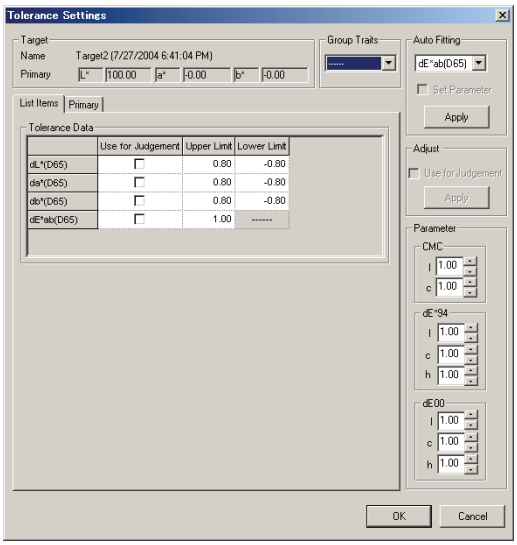
Parameter

Set the parameters for the color difference equation which requires parameter setting.
You cannot change parameters according to the illuminant. The parameters set here are always effective. When any of the parameters are changed, all the displayed data will be calculated again.

Items marked with Ⓟ are supported only by SpectraMagic NX Professional Edition.

List Items tab

When the check box in the Use for Judgement column is checked, the data is judged with the upper/lower tolerance values. Data boxes left unchecked are not judged.
Numerical values can be edited regardless of the status of the check mark.
The tolerance can be specified for each of colorimetric data items (list items) displayed in the list window.

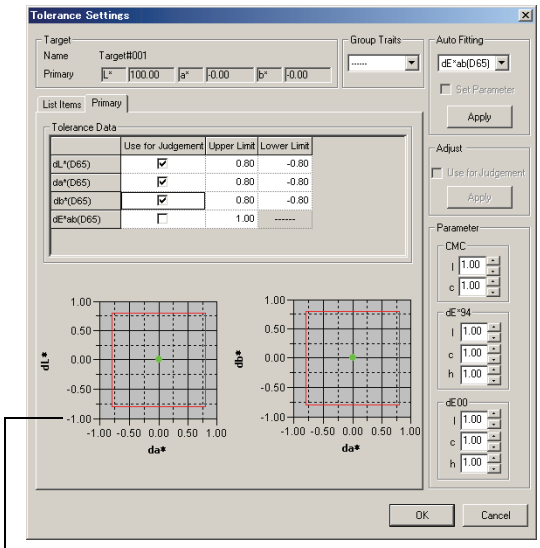


Primary/Secondary/Tertiary tabs

Items $\Delta L^*\Delta^*\Delta b^*$ and ΔE^*_{ab} for each illuminant, CMC, ΔE^*_{94} and ΔE_{00} can be specified independently from the list items.
The Primary/Secondary/Tertiary tab can be selected only when target data exists for the corresponding illuminant.

Group Traits:
Switches the attribute of the target data between SCI and SCE.

Parameter:
Specify the parameters of CMC, ΔE^*_{94} and ΔE_{00}.

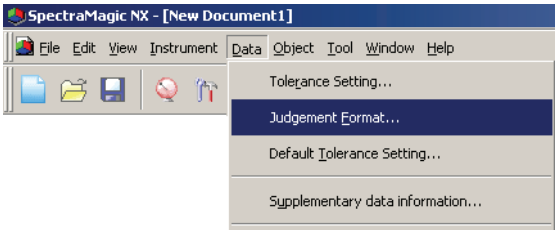


The graph reflects the Target settings shown above.

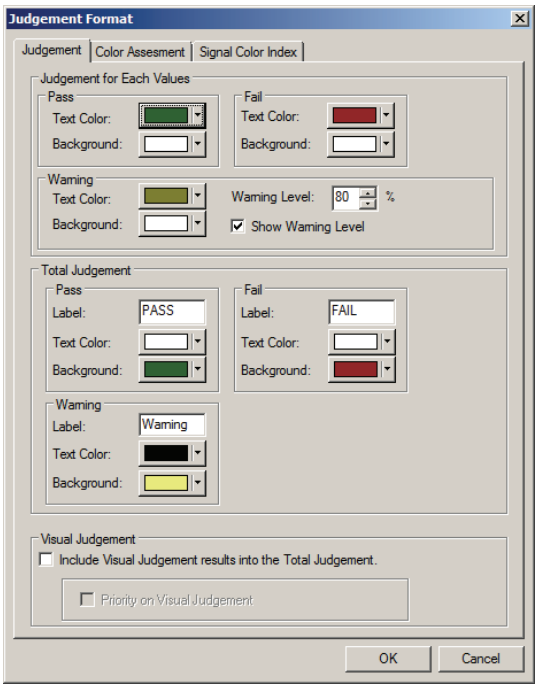
2.4.3-c Specifying the Judgement Format in the List Window

1. Select *Data* - *Judgement Format* from the menu bar.

The List Format dialog box appears.



2. Select the Judgement Tab and specify the parameters of the judgement format.



■ List Format dialog box

Judgement tab

Judgement for Each Values

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

Pass

Text Color: Specify the color of the numerical value in the list window when the value is judged as passed.

Background: Specify the background color of the numerical value in the list window when the value is judged as passed.

Fail

Text Color: Specifies the color of the numerical value in the list window when the value is judged as failed.

Background: Specifies the background color of the numerical value in the list window when the value is judged as failed.

Warning

Text Color: Specify the color of the numerical value in the list window when caution is required.

Background: Specify the background color of the numerical value in the list window when caution is required.

Warning Level: Specify the percentage of the passing level which is to be judged as the warning level.

Show Warning Level:
When this option is checked, the warning level is always displayed.

These settings are also applied to the pass/fail judgement color in the trend chart of the object.

Total Judgement

The following settings are applied to the judgement result following judgement of all the target items in the list window.

Pass

Label: Specifies the wording to be displayed when the result is judged as passed.

Text Color: Specifies the color of the string displayed in the list window when the result is judged as passed.

Background: Specifies the background color of the string displayed in the list window when the result is judged as passed.

Fail

Label: Specifies the wording to be displayed when the result is judged as failed.

Text Color: Specifies the color of the string displayed in the list window when the result is judged as failed.

Background: Specifies the background color of the string displayed in the list window when the result is judged as failed.

Warning

Label: Specify the text to be displayed as a caution message.

Text Color: Specify the color of the text in the list window when warning is required.

Background: Specify the background color of the text in the list window 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 fails the total judgement even though it passes all of the other judgements.

2.5 Measurement

To begin measurement, use one of the several methods available, as shown below.

Sample measurement:
Trigger the SpectraMagic NX software to take a measurement and obtain the sample data.

Sample remote measurement:
Perform measurement by pressing the measuring button of the instrument. The SpectraMagic NX software receives the sample data.
If the CM-700d/600d or CM-5/CR-5 is connected, pressing the measuring button once performs measurement up to the number of auto averagings set on the instrument. If a different instrument is connected, measurement is only performed once.

Interval measurement: Ⓟ
Start measurement by triggering the SpectraMagic NX software once to take a measurement using the interval time and number of measurements specified in advance. The measured sample data is received after every measurement.
Ⓟ This function is supported by the SpectraMagic NX Professional Edition only.

Sample automatic averaging measurement:
Trigger the SpectraMagic NX software once to begin measurement. After the specified number of measurements has been taken, the collected sample data is averaged to obtain one piece of sample data.

Sample manual averaging measurement:
Select manual averaging measurement mode. Take repeated measurements for the desired number of times and exit the mode. The sample data collected during the period is averaged to obtain one piece of sample data.

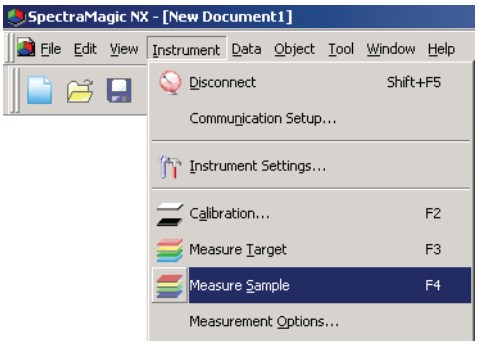
The methods above can also be combined to obtain sample data. Note that you cannot use the interval measurement in connection with the manual averaging measurement.

2.5.1 Performing Sample Measurement

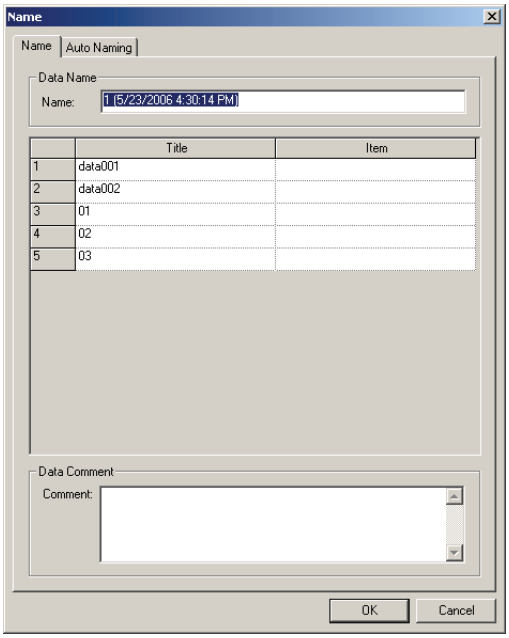
This procedure is available only when the spectrophotometer or the chroma meter is connected and the protection key is attached to the computer.

1. Select *Instrument* - *Measure Sample* from the menu bar.

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.
To assign a comment to each piece of sample data, select *Data* - *Data Property* from the menu bar after the measurement and type the comment in the displayed dialog box. (See page 103.)
This option cannot be selected in the Opacity/Haze mode.



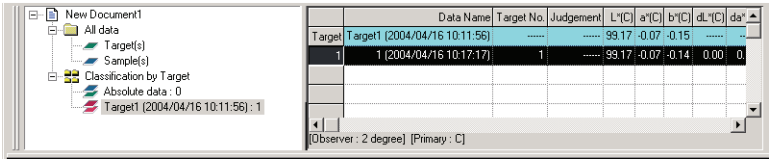
2. Enter the name of the data.
You can assign a name, supplementary data information Ⓟ and a comment for each piece of sample data. (See page 70.)
Select a supplementary data information item every time you measure.
Items marked with Ⓟ are supported only by SpectraMagic NX Professional Edition.



(Sample display of the Professional Edition)

3. Click the OK button.

When the opacity/haze measurement mode is set, measurements using a white background and a black background are conducted in succession.
Data is added to the graphic object in the list and canvas windows.



For details of the graphic object, see “Graphic Object Properties” on page 199.

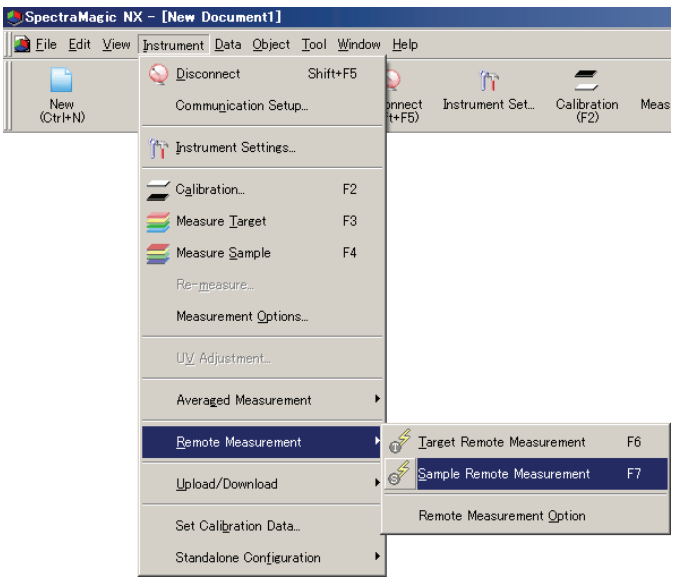
You can print measurement results with a serial printer after every measurement. See “Serial Printing” on page 129.

2.5.2 Performing Sample Remote Measurement

This procedure is available only when the spectrophotometer, excluding the CM-3000 Series or the chroma meter is connected and the protection key is attached to the computer.

1. Select *Instrument* - *Remote Measurement* - *Sample Remote Measurement* from the menu bar.

Checking this option enables remote measurement of sample data. When this option is selected, the measurement can be triggered either with the measuring button of the instrument or with the measuring command of the SpectraMagic NX software.
This option cannot be selected in the Opacity/Haze mode.



■ Target Remote Measurement and Sample Remote Measurement

Target Remote Measurement and Sample Remote Measurement cannot be selected simultaneously. If you select Sample Remote Measurement while Target Remote Measurement is checked, the check mark for Target Remote Measurement is deselected and a check mark appears for Sample Remote Measurement. If you select Sample Remote Measurement again, the check mark is deleted and Sample Remote Measurement is deselected.

When the CM-5 is connected

If Specular Component is set to SCI+SCE in Instrument settings, Sample Remote Measurement cannot be performed.

When the CM-700d/600d is connected

By setting options in advance, the results of the measurement or pass/fail judgement for the “target remote measurement” and “sample remote measurement” can be displayed on the LCD screen of the instrument. For the procedure of the advance setting, refer to page 195.

When a CM-2600-, CM-512m3-, or CR-400-Series instrument is connected

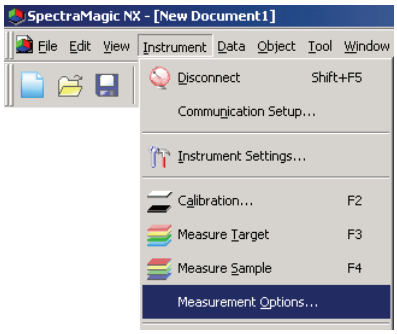
If the instrument's Communication Mode is canceled and then set again using instrument controls, Sample Remote Measurement will be canceled on the instrument. When this occurs, uncheck Sample Remote Measurement and then check it again to re-enable Sample Remote Measurement.

2.5.3 Performing Interval Measurement Ⓟ

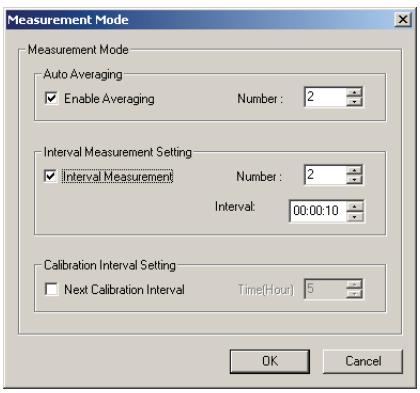
This procedure is available only when the spectrophotometer or the chroma meter is connected and the protection key is attached to the computer.
This function is supported by the SpectraMagic NX Professional Edition only.

1. Select *Instrument* - *Measurement Options* from the menu bar.

The Measurement Mode dialog box appears.
Check Interval Measurement and specify the options for the interval measurement.



The interval measurement repeats measurement a specified number of times at specified intervals. The measured sample data is received after every measurement.



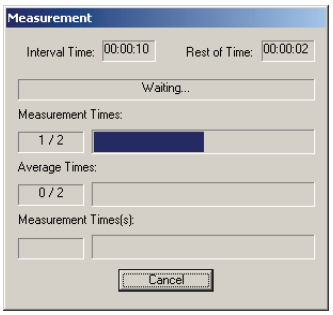
■ Measurement Mode dialog box

See “Measurement Mode dialog box” on page 63.

2. Click the OK button.

3. Perform the measurement described on page 93.

The Measurement dialog box appears and interval measurement is performed.
During interval measurement, data is added to the list window after every measurement.

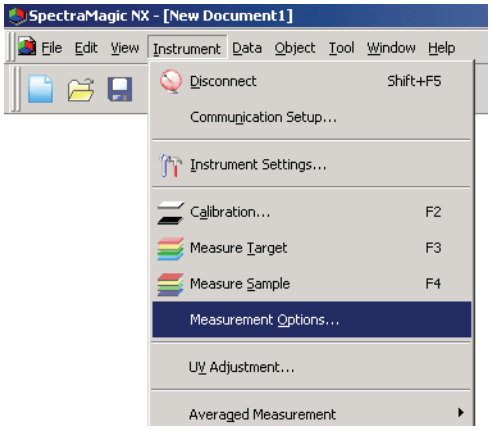


2.5.4 Performing Sample Automatic Averaging Measurement

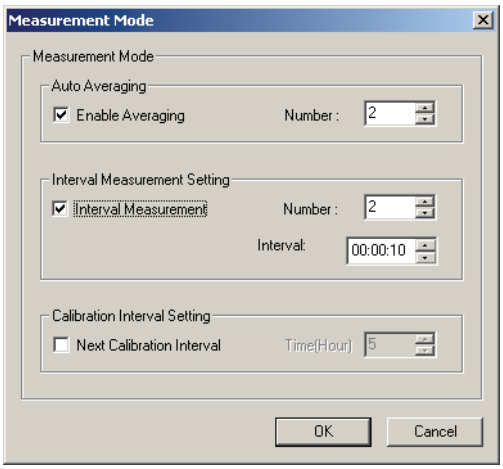
This procedure is available only when the spectrophotometer or the chroma meter is connected and the protection key is attached to the computer.

1. Select *Instrument* - *Measurement Options* from the menu bar.

The Measurement Mode dialog box appears. Check “Enable Averaging” to enable automatic averaging measurement of sample data.



During automatic averaging measurement of sample data, measurements are repeated the specified number of times. When the measurement is completed, the collected sample data is averaged to obtain one piece of sample data.



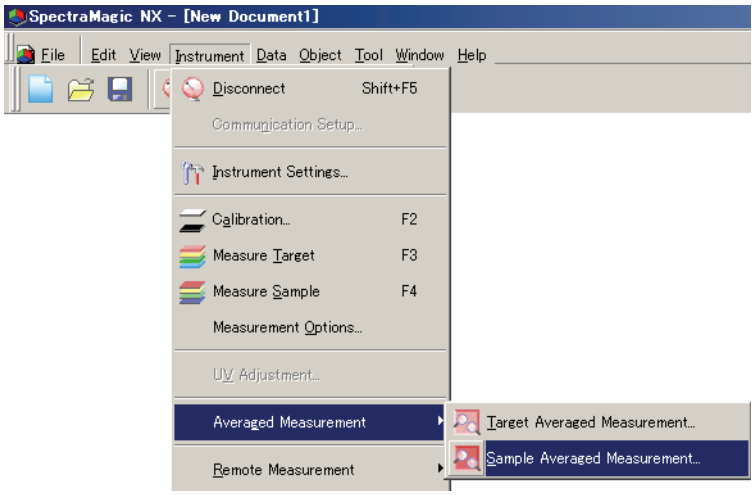
■ Measurement Mode dialog box

See “Measurement Mode dialog box” on page 63.

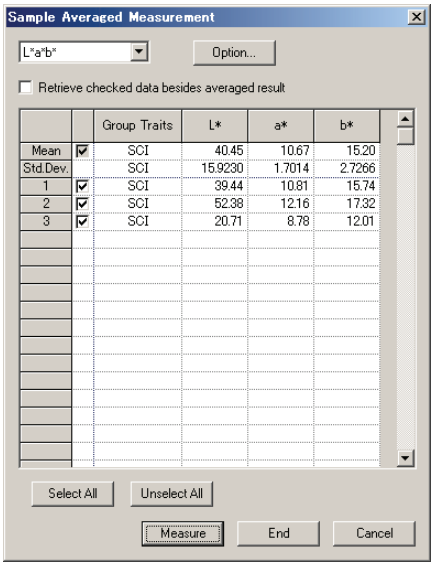
2.5.5 Performing Sample Manual Averaging Measurement

This procedure is available only when the spectrophotometer or the chroma meter is connected and the protection key is attached to the computer.

1. Select *Instrument* - *Averaged Measurement* - *Sample Averaged Measurement* from the menu bar.
   The Sample Averaged Measurement dialog box appears.



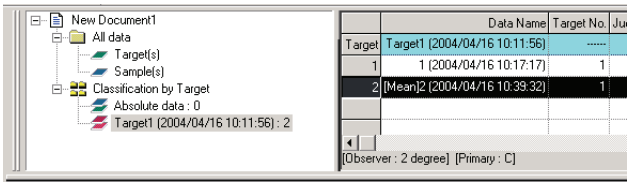
2. Click the Measure button repeatedly to perform measurement the desired number of times.
   When the opacity/haze measurement mode is set, measurements using a white background and a black background are conducted.
   The sample data is displayed in the dialog box.
   The average and standard deviation are calculated and displayed for each measurement. The data with the check mark is 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 list window and to the graphic object in the canvas window as one piece of sample data.

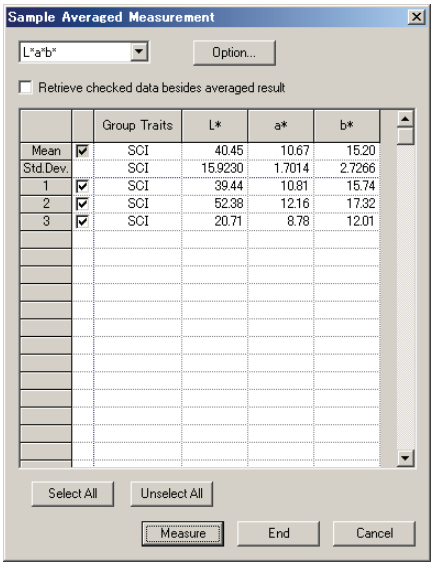
The averaging calculation performed here first averages spectral reflectance or XYZ data to obtain data that is then used in the calculation of colorimetric data. On the other hand, the averaging calculation that uses the statistical values described on pages 109 and 110 averages the colorimetric data of each piece of data that was calculated individually according to its spectral reflectance or XYZ data. Consequently, the results of these two types of calculations may differ.



■ Sample Averaged Measurement dialog box

Color space drop-down List box

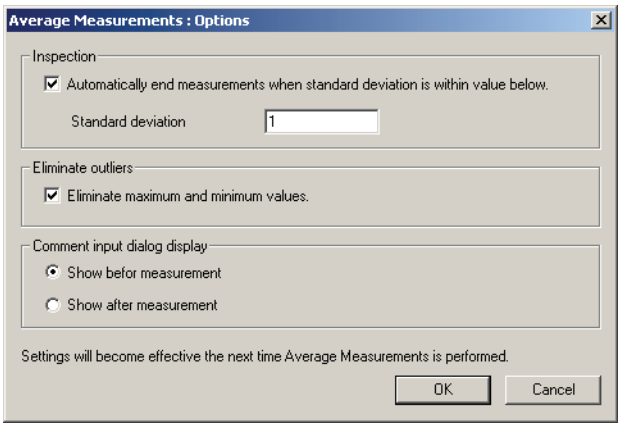
Select L*a*b*, XYZ, L*c*h, Hunter Lab, Yxy, L*u*v* or L*u'v' as the color space to display in the list.



Retrieve checked data besides averaged result

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

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, the manual averaging measurement finishes only after the measurement is 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.

Select All
All the sample data will be checked and selected.

Unselect All
All the sample data will be unchecked.

2.5.6 Uploading the Sample Data from the Instrument

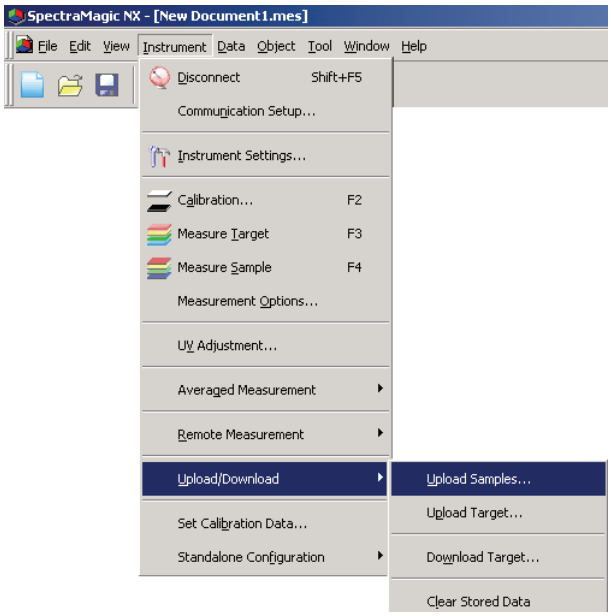
This procedure is available only when the spectrophotometer, excluding the CM-3000 Series or the chroma meter is connected and the protection key is attached to the computer.

The sample data stored in the memory of the instrument can be uploaded to the SpectraMagic NX software. If any target data is linked to the sample data to be uploaded, this target data is also uploaded.

This operation is disabled when the number of banks is 2 (UV100 + UV0 or Opacity) or 3 (UV100 + UV0 + UVadj).

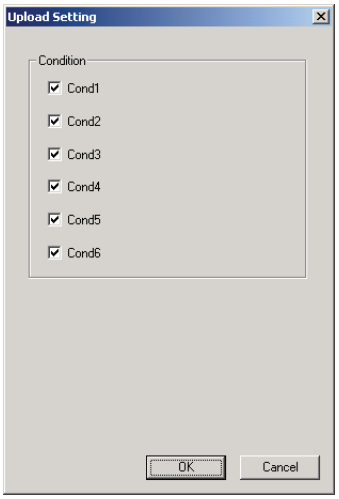
To refer to the measurement numbers set by the instrument at the time of measurement, be sure that "Data number" from the Instrument group is included as one of the Selected Items in the List Items dialog box. (See page 47.)

1. Select *Instrument* - *Upload/Download* - *Upload Samples* from the menu bar.
If the CM-2600d/2500d or CM-700d/600d is connected and if the number of banks has not been set for the file through measurement, the Bank dialog box appears. See page 57 for details on bank setting.



If the CM-2600d/2500d is connected, the Upload Setting dialog box appears.
If the ROM version of the CM-2600d/2500d is Ver. 1.21, Language Environment of Instrument is also displayed.

Specify the display language to be used for the instrument and the parameters of the data uploading operation. Click the OK button.

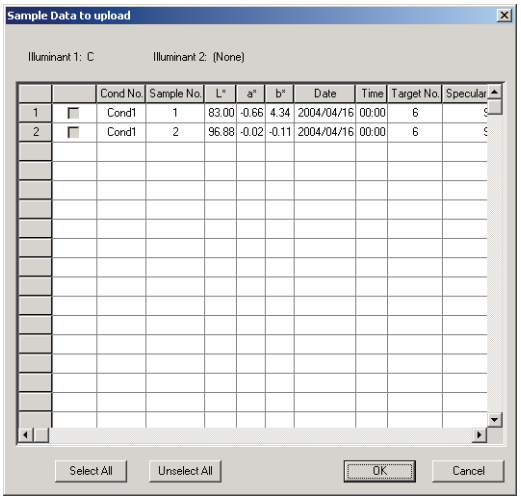


Sample display when the CM-2600d/2500d is connected

2. Uploading starts.

When the uploading is completed, the Sample Data to upload dialog box appears. Data with a check mark will be uploaded. Uncheck any unnecessary data.
Note that the data cannot be checked when:

- The target data linked with the sample data is colorimetric data and the illuminant and observer settings are different from those currently specified with the SpectraMagic NX software.
- The connected instrument is the CR-5 and the illuminant and observer settings are different from those currently specified with the SpectraMagic NX software.
- The number of banks is different from the number currently set in the file.
- The connected instrument is the CM-2600d/2500d/700d/600d and the number of banks for the data to be uploaded is different to the number of banks for linked target data.



Sample display when the CM-2600d/2500d is connected

3. When the OK button is clicked, the data is added to the list window and to the graphic object in the canvas window.

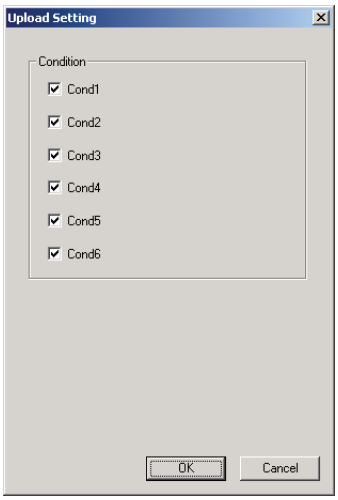
■ Upload Setting dialog box (only when the CM-2600d/2500d is connected)

Condition

The data corresponding to the checked items will be retrieved.

Language display of instrument

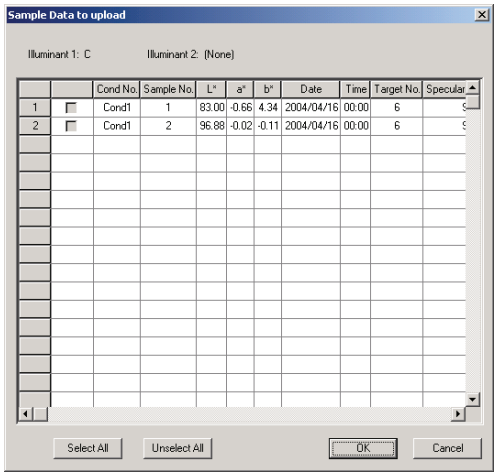
Instruments with ROM version 1.21 offer a selectable display language.



■ Sample Data to upload dialog box (only when the CM-2600d/2500d, CM-700d/600d or CM-5/CR-5 is connected)

Select All: All of the sample data will be checked and selected.

Unselect All: All of the sample data will be unchecked.



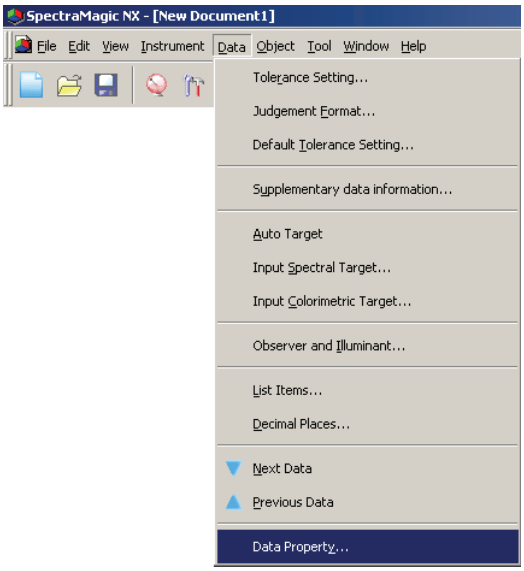
Sample display when the CM-2600d/2500d is connected

2.5.7 Displaying Data Properties

You can display the properties of the data selected in the list window.

1. Select data in the list window.
   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.

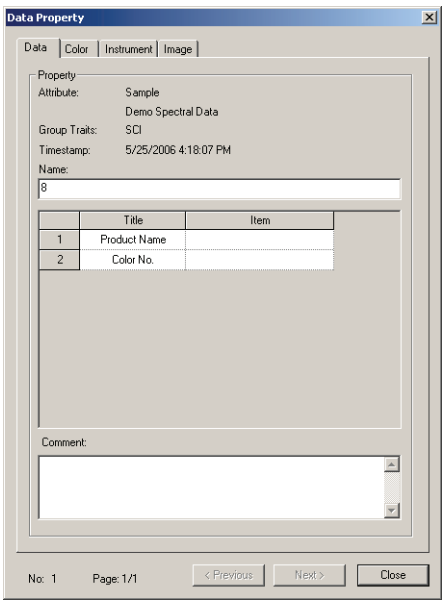
2. Select *Data* - *Data Property* in the menu bar.
The Data Property dialog box appears.

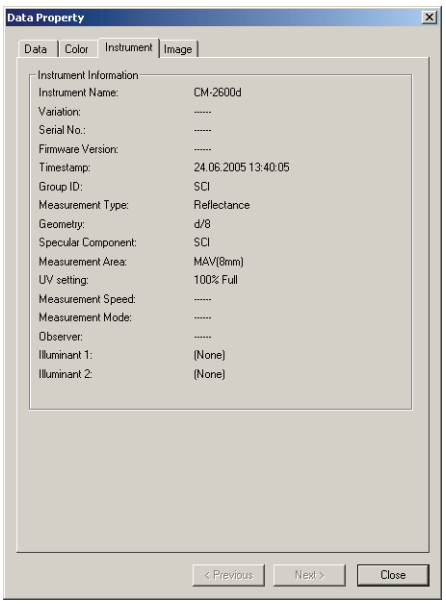


In addition to using the menu bar, you can select Data Property by right-clicking the data in the list window and selecting the command from the displayed context menu. You can also display the Data Property dialog box by double-clicking on data in the list window. When two or more pieces of data have been selected in the list window, you can navigate among the selected pieces of data one by one with the Previous and Next buttons.

3. Specify the data properties as required.

■ Data Property dialog box





The following properties can be edited or changed.

Items marked with Ⓟ are supported only by SpectraMagic NX Professional Edition.

Data tab

- Name
- Item (of supplementary data information) Ⓟ
- Comment

Color tab Ⓟ

- Visual Judgement
- PseudoColor

For details of these parameters, refer to page 105.

Image tab

- Image file
- Image position marker
- Marker color

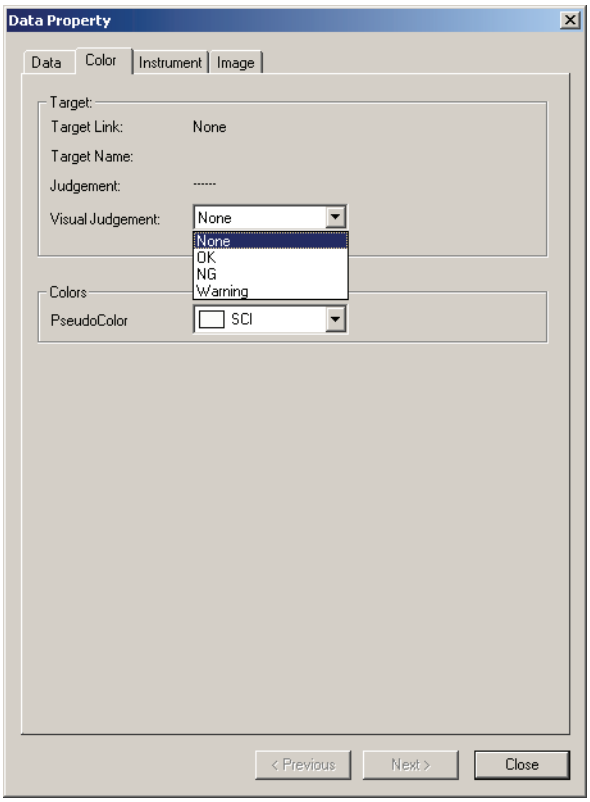
For details of these parameters, refer to page 106.

2.5.8 Using the Visual Judgement of Data Ⓟ

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

1. Select Visual Judgement on the Color tab of the Data Property dialog box.

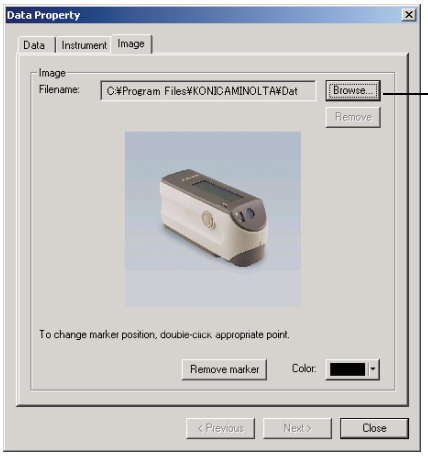
Select one of None, OK, NG and Warning.
You can set the function so that the specified visual judgement result affects the total judgement.
Refer to page 90 for the setting procedure.



2.5.9 Linking an Image to Data

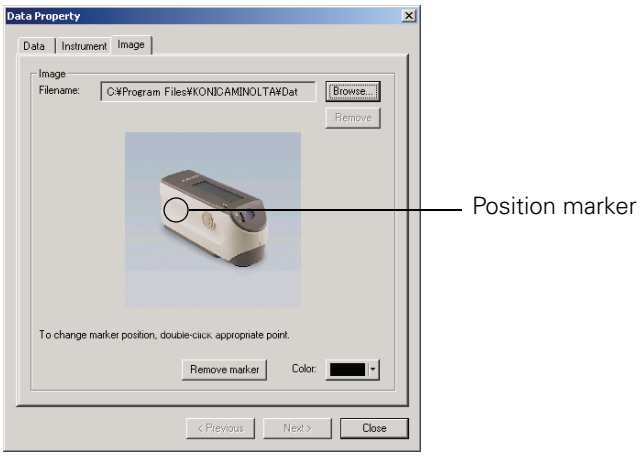
1. Click the Browse button in the Image tab of the Data Property dialog box. In the dialog box for selecting a file to be opened, select the image file directly.

The selected image file is displayed. You can select a file in either JPEG or BMP file format. Note that the SpectraMagic NX software does not store the image file itself but only remembers the path to the file. Do not change the filename or the directory of the image file with Internet Explorer or other software.



Setting a position marker

Double-click the point where you want to set a marker in the image. A marker appears at that point. Only one marker can be set per image. If you try to set a second marker at a different point, the marker will move to that point. Note that the SpectraMagic NX software does not actually draw a marker in the image file but only remembers the position of the marker.

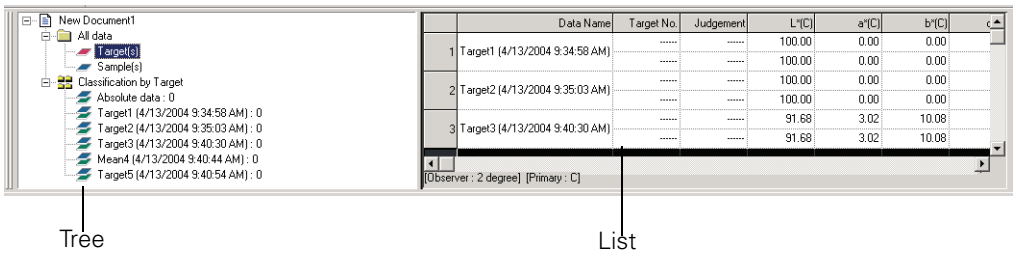


■ Data Property dialog box

Remove
The specified image setting is canceled.
Remove marker
The marker is removed from the image.
Color
The color of the marker can be changed.
To specify a color, see page 154.

2.6 List Window Operation

The list window lists sample data. You can show or hide the list window by selecting *View - List Window* from the menu bar.



2.6.1 Tree

The tree in the list window includes the following items.

Document filename

- All data
  - Target(s)
  - Sample(s)
- Classification by Target
  - Absolute data: Data count
  - Master target 1: Data count
    - Working target A
    - Working target B
  - Master target 2: Data count
  - Master target 3: Data count
    - Working target C
- Search
  - Search Cond 1: Data count
  - Search Cond 2: Data count

The Classification by Target folder contains the data groups that have been classified by target data and a data group that is not linked to any target data (i.e. absolute value sample data). When target data is registered, a new “Target” data group is created. When a document file is created, an “Absolute data” data group is created.

In the Search folder, a data group which satisfies the condition specified in the Search dialog box is displayed.

2.6.2 List

The list command lists the data included in the data group selected in the tree. Each item is displayed according to the list items specified on page 46.

The items x, y, u', v', Δx, Δy, Δu' and Δv' are expressed to four decimal places. Other colorimetric data is expressed to two decimal places.

The number of decimal places can be changed. See page 62 for details.

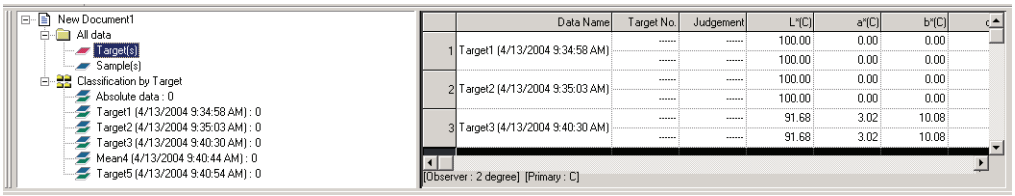
The SpectraMagic NX software enhances calculation accuracy by performing internal calculations with numbers more precise than those actually displayed. Consequently, the least significant digit displayed may differ from that of the instrument by one digit due to rounding or color space conversion.

For example, when the specular component treatment is specified as SCI + SCE, a piece of data is displayed on two lines. When the CM-512m3A or CM-512m3 is connected, a piece of data is displayed on three lines. The list command thus lists data by automatically adjusting the number of lines according to the conditions and instrument.

The content of the list window and the function of the graphic objects in the canvas window vary depending on the data group selected, as follows:

■ **All Data - Target(s)**

All target data existing in the document file is listed.

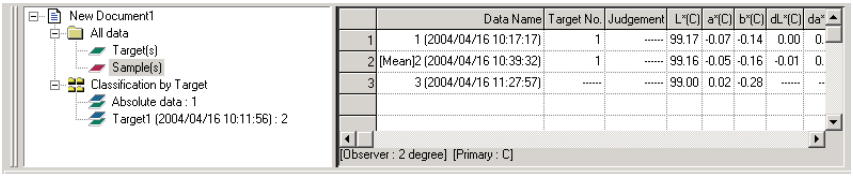


Functions of graphic objects

Absolute value graph, xy chromaticity diagram	The distribution of all data in the list is displayed.
Color difference graph	The selected data (the last piece of data in the list when two or more pieces of data are selected) is displayed.
Spectral graph	The selected data (the first piece of data in the list when two or more pieces of data are selected) is displayed (without difference indication).
Trend chart/histogram	All data in the list is displayed.
Image	The image of the selected data (the first piece of data in the list when two or more pieces of data are selected) is displayed.
Numerical object with target display attribute	The numerical value of the selected data (the first piece of data in the list when two or more pieces of data are selected) is displayed.
Numerical object with sample display attribute	Not displayed.

■ All Data - Sample(s)

All sample data existing in the document file is listed.

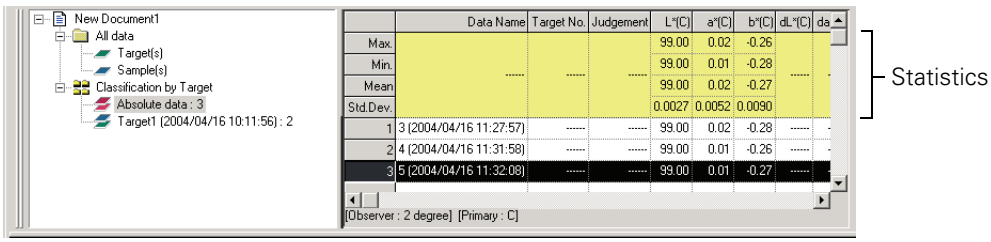


Functions of graphic objects

Absolute value graph, xy chromaticity diagram	The distribution of all data in the list is displayed.
Color difference graph	Not displayed.
Spectral graph	The selected data is displayed (without difference indication).
Trend chart/histogram	All data in the list is displayed.
Image	The image of the selected data (the first piece of data in the list when two or more pieces of data are selected) is displayed.
Numerical object with target display attribute	Not displayed.
Numerical object with sample display attribute	The numerical value of the selected data (the first piece of data in the list when two or more pieces of data are selected) is displayed.

■ Classification by Target - Absolute data

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



Statistical value

The statistics of the absolute data are displayed. The statistics are displayed when List - Categorized List - Show Statistics is checked in the Data List tab of the Display Settings dialog box. To view this dialog box, select *Tool* - *View Settings* from the menu bar. The display can be set to on or off per item such as Max., Min. The list of statistics cannot be scrolled.

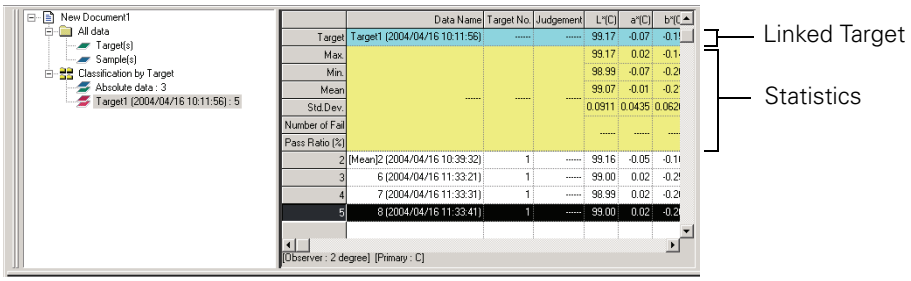
The averaging calculation performed here averages the colorimetric data of each piece of data that was calculated individually according to its spectral reflectance or XYZ data.
On the other hand, the manual averaging measurement (described on page 98) and the averaging of list data (on page 115) first average spectral reflectance or XYZ data to obtain data that is then used in the calculation of colorimetric data. For this reason, the results of these two types of calculations may differ.

Functions of graphic objects

Absolute value graph, xy chromaticity diagram	The distribution of all data in the list is displayed.
Color difference graph	Not displayed.
Spectral graph	The selected data is displayed (without difference indication).
Trend chart/histogram	All data in the list is displayed.
Image	The image of the selected data (the first piece of data in the list when two or more pieces of data are selected) is displayed.
Numerical object with target display attribute	Not displayed.
Numerical object with sample display attribute	The numerical value of the selected data (the first piece of data in the list when two or more pieces of data are selected) is displayed.

■ **Classification by Target - Target ****

Of all sample data existing in the document file, only the sample data linked to the specified target data is listed.



Linked target data

The linked target data is displayed when List - Categorized List - Show Linked Target is checked in the Data List tab of the Display Settings dialog box. To show this dialog box, select *Tool - View Settings* from the menu bar. The lines of the linked target data cannot be scrolled.

Statistical value

The statistical values of the sample data linked with the target data are displayed.
The statistics are displayed when List - Categorized List - Show Statistics is checked in the Data List tab of the Display Settings dialog box. To show this dialog box, select *Tool - View Settings* from the menu bar. The display can be set to on or off per item such as Max., Min. The lines of the statistics cannot be scrolled.

The averaging calculation performed here averages the colorimetric data of each piece of data that was calculated individually according to its spectral reflectance or XYZ data.
On the other hand, the manual averaging measurement (described on page 98) and the averaging of list data (on page 115) first average spectral reflectance or XYZ data to obtain data that is then used in the calculation of colorimetric data. For this reason, the results of these two types of calculations may differ.

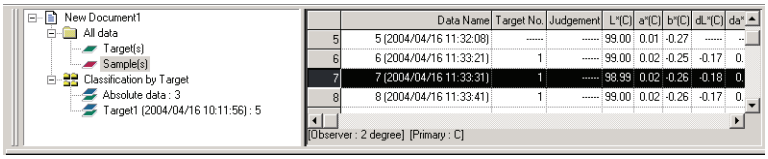
Functions of graphic objects

Absolute value graph, xy chromaticity diagram	The distribution of all data in the list is displayed.
Color difference graph	The distribution of all data in the list is displayed. (In ΔL*a*b* graph, contrast hue locus and contrast chroma locus are displayed.)
Spectral graph	The target data and selected data are displayed (with difference indication).
Trend chart/histogram	All data in the list is displayed (reference line display).
Image	The image of the selected data (the first piece of data in the list when two or more pieces of data are selected) is displayed.
Numerical object with target display attribute	The target data is displayed.
Numerical object with sample display attribute	The numerical value of the selected data (the first data in the list when two or more pieces of data are selected) is displayed.

2.6.3 Editing the List Data

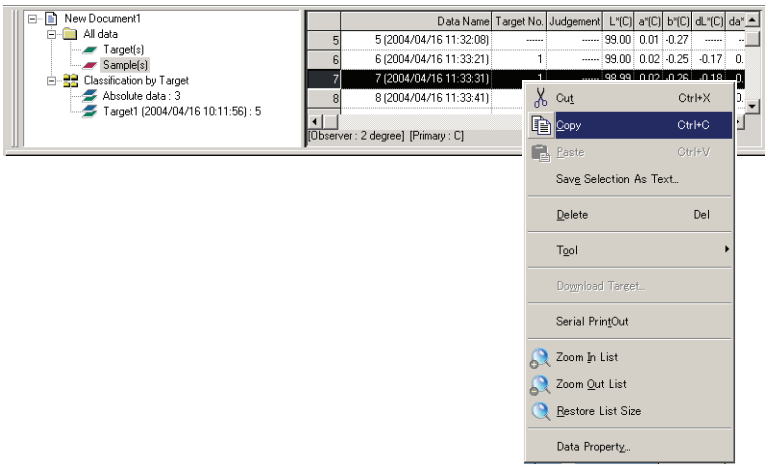
■ Selecting the list data

When the mouse pointer is positioned over the leftmost column (number column) in the list, the shape of the pointer changes into an arrow. Click the list data with this arrow to select the data. To select two or more pieces of data, click the first piece of data and specify the range by clicking the last piece of data while holding down the Shift key, or click the desired pieces of data one by one while holding down the Ctrl key. You can also select a range by dragging the mouse. To select noncontiguous pieces of data, hold down both the Shift and Ctrl keys. Data in different folders cannot be selected.



■ Copying the list data

Right-click the selected (highlighted) data and select *Copy* from the displayed context menu. Or, select the data and then select *Edit* - *Copy* from the menu bar. 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. Or, select the data and then click *Edit* - *Cut* from the menu bar.

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. Or, select *Edit* - *Paste* from the menu bar. 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.

■ Simultaneous copy-and-paste of the list data

The list data can also be copied or moved by drag-and-drop operation. To drag data, select the data and move the mouse pointer to the boundary of the selected data. When the shape of the pointer changes into a square, drag the data and drop it at the desired point to move the data. If you drag-and-drop data while holding down the Ctrl key, the data is copied and pasted.
If you move sample data from a data group classified by target into another data group classified by target, the linkage between the sample data and the target data changes.

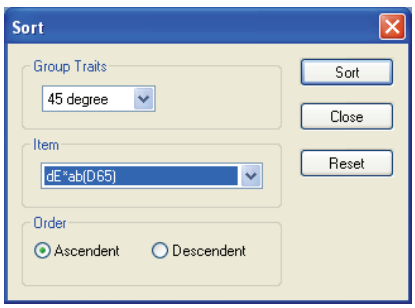
■ Deleting the list data

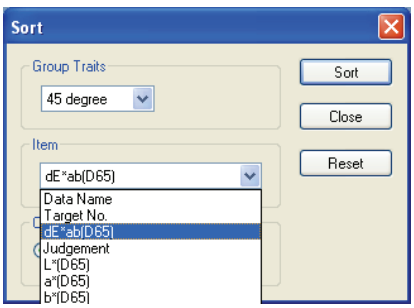
Right-click the selected (highlighted) data and select *Delete* from the displayed context menu. Or, select the data and select *Edit - Delete* from the menu bar. If more than one piece of data is selected, all the selected data will be deleted simultaneously. When target data is deleted, the sample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

■ Sorting the list data

The list data can be sorted according to a list item. For example, data can be arranged in ascending order according to the ΔE*ab value. Right-click inside the list and select *Sort* from the displayed context menu. Or, select *Tool - Sort* from the menu bar. The data to be sorted is the list data in the list. When *Sort* is selected, the Sort dialog box appears.

If the list data has two or more banks of data, the data specified in Group Traits is used as the sort key.





Copying, cutting, and pasting cannot be executed after the list data has been sorted.
To perform copying, cutting, and pasting, clear the settings in the Sort dialog box.

■ Saving the list data in text format

Right-click the selected (highlighted) data and select *Save Selection as Text* from the displayed context menu. Or, select the data and select *File - Save Selection As Text* from the menu bar. The data is saved as a tab-delimited text in a text file with the extension ".txt" or as a file using a delimiter specified in the Control Panel (extension: csv).

■ Saving the list data in XML format

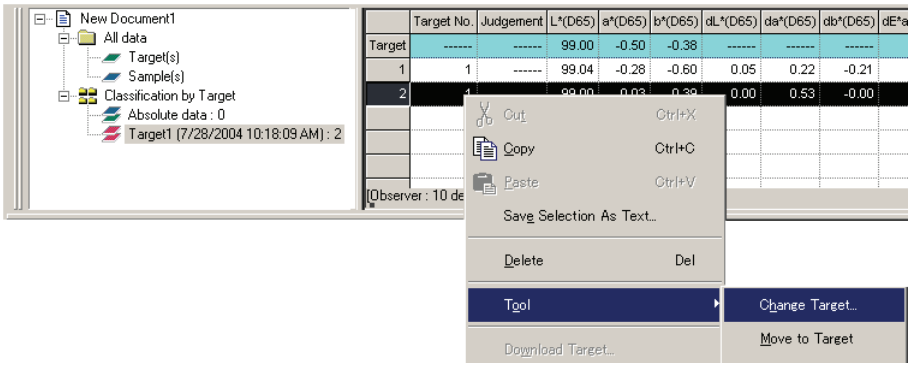
Right-click the selected (highlighted) data and select *Save List Items As XML* from the displayed context menu. Or, select the data and select *File - Save List Items As XML* from the menu bar.
The data is saved as an XML file with the extension ".xml".

2.6.4 Changing the Linkage with Target Data

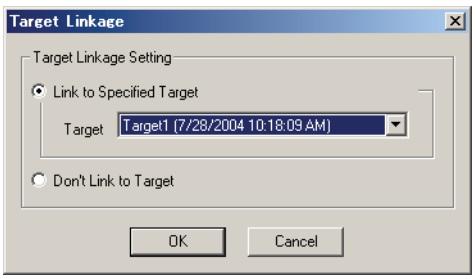
Any and all pieces of sample data can be linked to any target data. The linkage can be changed any time.

1. Right-click the selected (highlighted) list data and select *Tool* - *Change Target* from the displayed context menu. Or, select the desired list data and select *Tool* - *Change Target* from the menu bar.

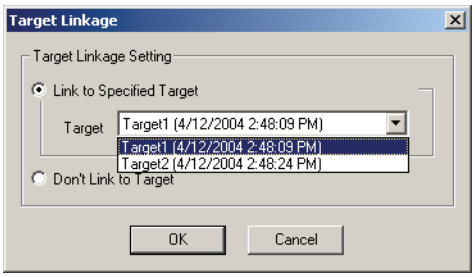
   When the command is selected, the Target Linkage dialog box appears.



2. Specify the linkage to target data.



■ Target Linkage dialog box



Target Linkage Setting

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

Don't Link to Target
The selected data loses its linkage to any target data. The data becomes absolute data.

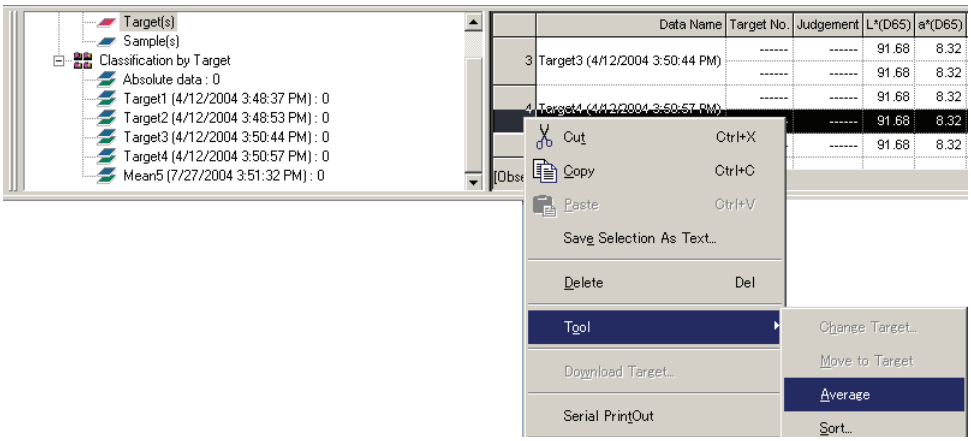
You can also change the linkage to target data by moving the list data (by means of drag-and-drop). For details, see page 112.

2.6.5 Adding Averaged Data

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

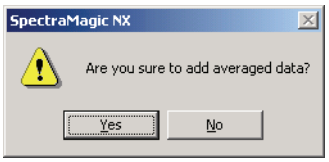
1. Right-click the selected (highlighted) list data and select *Tool* - *Average* from the displayed context menu. Or, select at least one piece of list data and select *Tool* - *Average* from the menu bar.

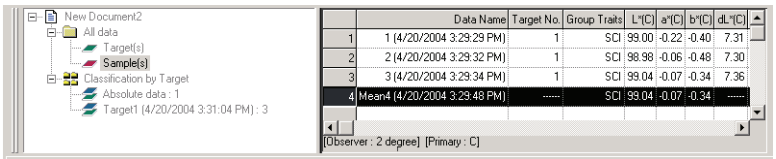
A dialog box with the following message appears: "Are you sure to add averaged data?"



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. On the other hand, the averaging calculation that uses the statistical values described on pages 109 and 110 averages the colorimetric data of each piece of data that was calculated individually according to its spectral reflectance or XYZ data. Consequently, the results of these two types of calculations may differ.



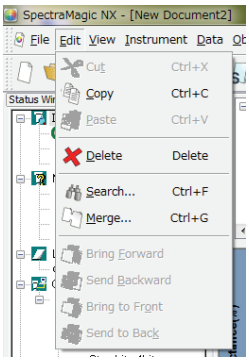


2.6.6 Searching for data

You can search the list of data for the data which satisfies the specified condition and display the data. Note, if document files are created using SpectraMagic NX version 2.03 or prior versions, depending on the instruments and settings, you may not be able to search the list.

1. Select *Edit* - *Search* from the menu bar.

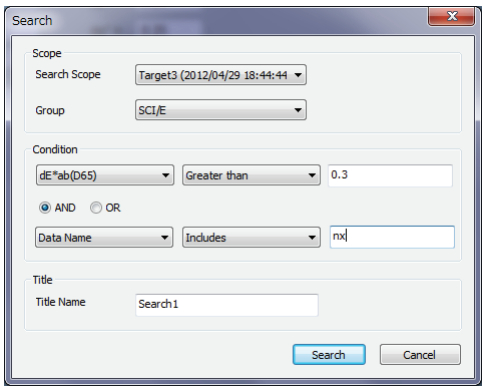
Instead of using the menu bar, you can select Search in the context menu which is displayed by right-clicking the tree display in the list window.



2. Specify the options for the search and click the Search button.

The name of the specified search condition appears in the tree display in the list window, and the data which satisfies the search condition is displayed in the list display.

■ **Search dialog box**



Scope

Search Scope
Select a data group to be used for the search.

Group
You can set specific group traits as a search scope depending on the bank setting of the document file.
For example, when Bank is set to 1, you can select from SCI/E, SCI and SCE.
When group traits for the number of banks of 2 or 3 are selected, data which satisfies the condition of any of the group traits is displayed in the list.

Condition
Specify the condition of the search for the specified list item.

Two search conditions can be set which can be related by AND/OR condition.

Name
Name the specified search condition. This name will be displayed in the tree display in the list window.

About search

■ **Editing the search condition**

When you right-click the search condition in the tree display and select Edit from the displayed context menu, the Search dialog box appears. In this dialog box, you can edit the current search settings.

■ **Refreshing the search result**

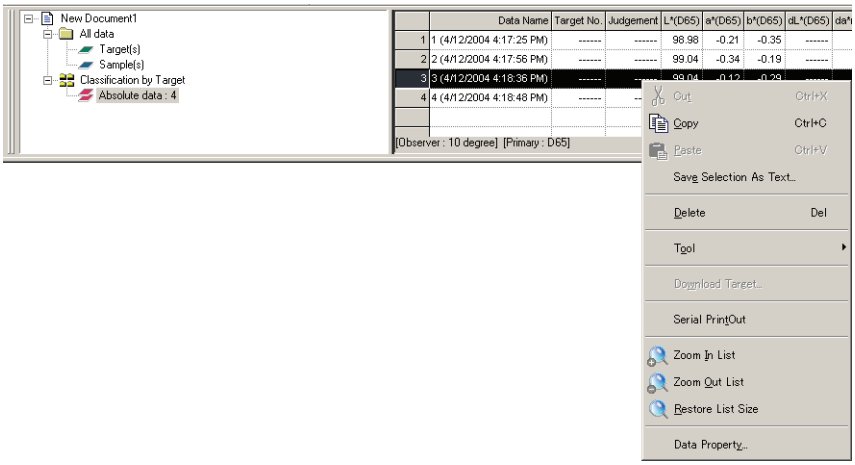
When you right-click the search condition in the tree display and select Refresh from the displayed context menu, the search is repeated based on the search condition. If you add new data after setting the search condition, you can repeat the search including the new data.
Note that when you change the observer/illuminant and then select Refresh, the search result may be different from the previous result.

■ **Deleting the search condition**

When you right-click the search condition in the tree display and select Delete from the displayed context menu, or when you select the search condition in the tree display and then select Edit - Delete from the menu bar, the search condition is deleted.
The data in the list display disappears, however, the data itself remains in the document file.

2.6.7 Enlarging/Reducing the List Size

Right-click inside the list to display the context menu or select *View* in the menu bar. Select an appropriate command.



■ Enlarging the list size

1. Select *Zoom In List*.

The size of the list is enlarged.

■ Reducing the list size

1. Select *Zoom Out List*.

The size of the list is reduced.

■ Restoring the list size

1. Select *Restore List Size*.

The size of the list is reset to the default size.
The default size can be changed. Refer to page 151 for the procedure to change the default size.

2.7 Canvas Window Operation

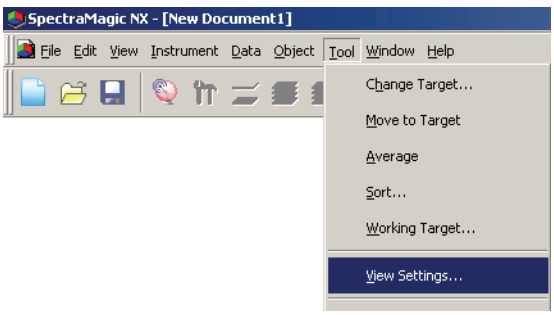
The canvas window displays data as graphs. The SpectraMagic NX software provides various types of graphs that can be placed in the window as desired. The canvas window is available in two types of views: Display view and Printing view. The views can be added up to a combined total of 10 views. Use display view to place graphic objects in order to check the measurement results on the PC display. Use printing view to place graphic objects in order to print out a test report.
See page 199 for details of the graphic objects.

2.7.1 Editing the Canvas Window

Graphs, charts and their components are called graphic objects.
To edit graphic objects, set the canvas window to edit mode.

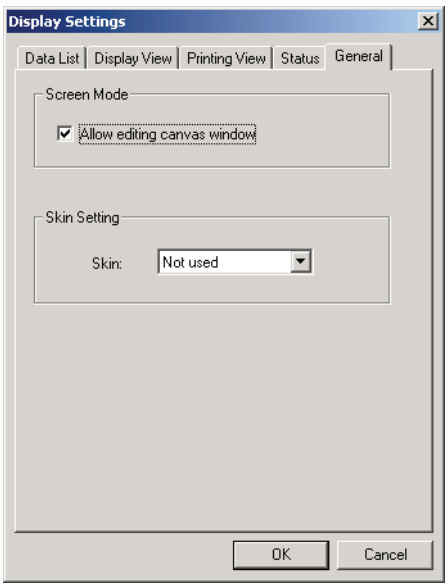
1. Select *Tool* - *View Settings* from the menu bar.

   The Display Settings dialog box appears.



2. Select the General tab.
3. Check “Allow editing canvas window” and click the OK button.
4. Check *Tool* - *Edit Mode* in the menu bar.

   The canvas window enters graphic object edit mode.

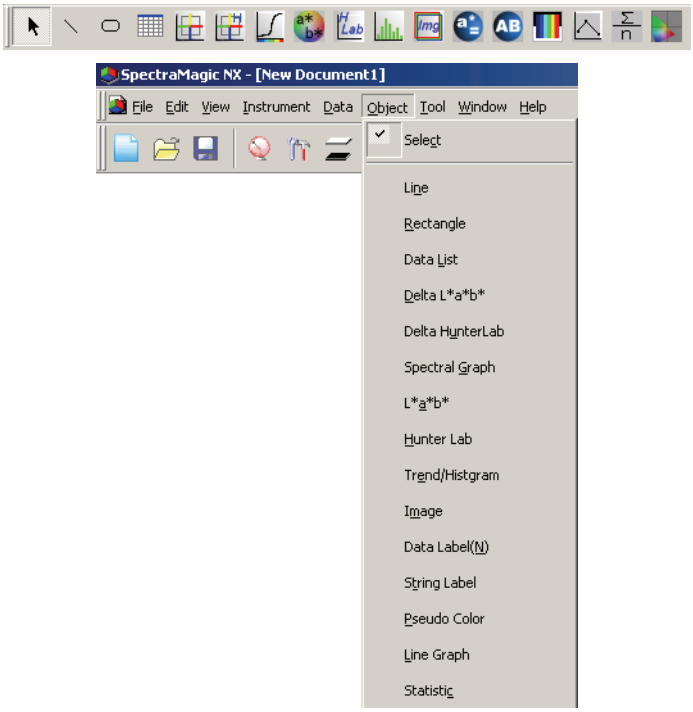


See pages 151 and 152 for the details of other setting items in the Display Settings dialog box.

2.7.2 Pasting a Graphic Object

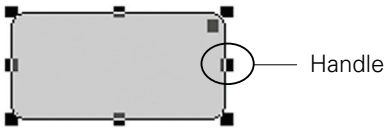
1. Select a graphic object.

Select a graphic object to paste into the tool bar or select it from the *Object* menu in the menu bar. When a graphic object is selected, the mouse pointer changes shape.



2. Paste the graphic object.

Drag the graphic object over the canvas window and paste it in the desired location. A frame with handles appears around the graphic object. Drag the appropriate handle to change the size of the object as desired.
Unless the number of banks has already been set for the file through measurement, the Bank dialog box appears. See page 57 for details on bank setting.



2.7.3 Editing the Graphic Object

■ Selecting a Graphic Object

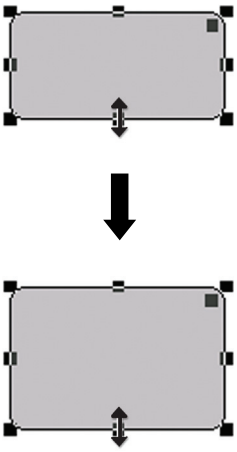
When you click the inside of the frame of a graphic object that has been pasted in the canvas window, the graphic object is selected. You can select two or more objects by selecting them while holding down the Shift key.
When you drag the mouse pointer to enclose a graphic object, the object is also 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.
Even if several document files are opened, you cannot select graphic objects in more than one document file.

■ Deselecting a Graphic Object

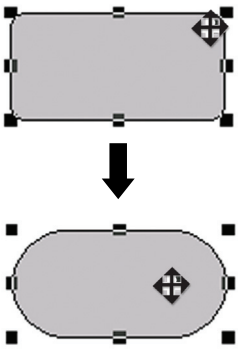
Click inside any area other than that of the pasted graphic objects or click the ESC key. When two or more graphic objects are selected, clicking an object while holding down the Shift key deselects only that object.

■ 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.

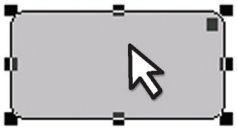


With a rectangular object, dragging the handle at the upper right corner rounds the corners, converting the shape from a rectangle to an ellipse.



■ Moving a Graphic Object

Click and select a graphic object and move the mouse pointer to any point inside the frame. Drag the object to the desired location.



■ 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 selecting *Edit* - *Copy* from the menu bar or 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 out 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 selecting *Edit* - *Cut* from the menu bar or 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 an object and select *Paste* from the displayed context menu. You can also paste it by selecting *Edit* - *Paste* from the menu bar or 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 window of another document file.

■ Aligning Graphic Objects

When two or more graphic objects are selected, the handle for the object selected first is displayed in light blue, and the handle for the object selected second or later is displayed in green. Under such conditions, you can select one of the alignment menus by selecting *Object* - *Align* from the menu bar to align the graphic objects on the screen by using the first-selected object as a reference.

■ Deleting a Graphic Object

Click and select a graphic object. Select *Edit* - *Delete* from the menu bar or press the Delete key. When two or more objects are selected, all the selected objects are deleted simultaneously.

2.7.4 Adding a New View/Deleting a View Ⓟ

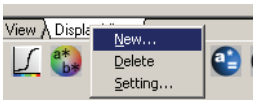
This function is supported by the SpectraMagic NX Professional Edition only.

You can add up to 10 views on which graphic objects can be pasted. You can create customized views for different purposes by placing graphic objects according to the purpose of each view.
Views can be changed by clicking the tab.

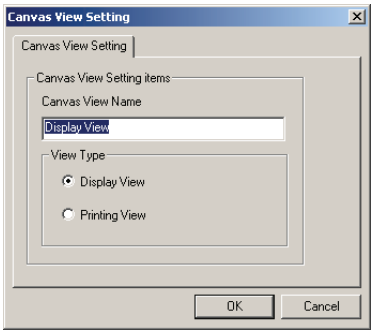
■ Adding a new view

1. Right-click the tab at the bottom of the canvas window to display a pop-up menu, and then select *New* from the menu.

The Canvas View Setting dialog box appears.
If 10 views already exist, you cannot select *New*.



2. Specify the items of the canvas view setting.



■ Canvas View Setting dialog box

Canvas View Setting items

Canvas View Name

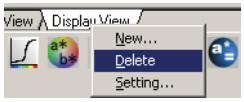
Type the name of the view in the text box. Up to 20 alphanumeric characters can be used. The specified view name is shown on the tab at the bottom of the canvas window.

View Type

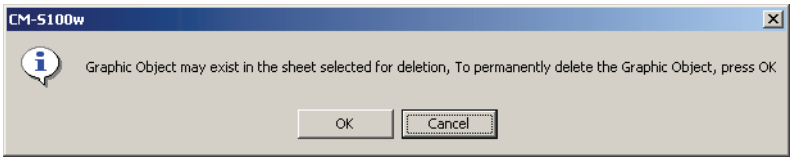
Select either Display View or Printing View.

■ Deleting a view

1. Right-click the tab at the bottom of the canvas window to display a pop-up menu, and then select *Delete* from the menu.



If any graphic objects are placed on the view, the message “To permanently delete the Graphic Object, press OK” appears. Click the OK button.



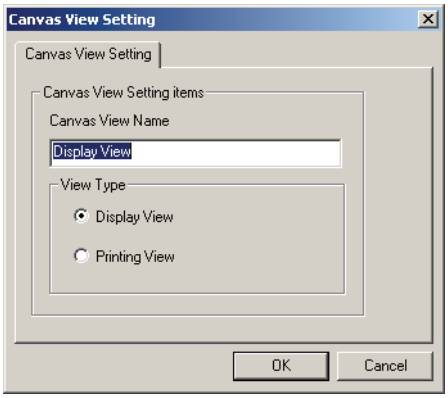
The specified view is deleted.
Both the last display view and printing view cannot be deleted. A document file must include one display view and one printing view.

■ Changing the name/type of view

1. Right-click the tab at the bottom of the canvas window to display a pop-up menu, and then select *Setting* from the menu.

The Canvas View Setting dialog box appears.

2. Change the items specified in the initial view settings.



2.7.5 Run Mode of the Canvas Window

When *Tool* - *Edit Mode* in the menu bar is not checked, the canvas window is in run mode.

In run mode, you cannot change the size or position of graphic objects or paste a new graphic object. These operations are available only in edit mode. The following operations are available in run mode:

- When you double-click a graphic object, you can view the properties of that object.
- When you right-click a graphic object and select *Copy* from the displayed context menu (or select *Edit* - *Copy* from the menu bar), the object is copied to the clipboard in bitmap form. This data can be pasted into an a software program such as Microsoft Excel.

  Note: DO NOT select this setting unless you are logged in as an Administrator on the computer being used. If this setting is selected by someone who is not logged in as an Administrator, it will immediately become impossible for SpectraMagic NX to be operated except by someone logged in as Administrator.

2.7.6 Window Operation when the List Window is Hidden

Select the data to display in the canvas window in the following procedure.

Preparation

Before you can select the data, you must first add the necessary buttons to the toolbar.

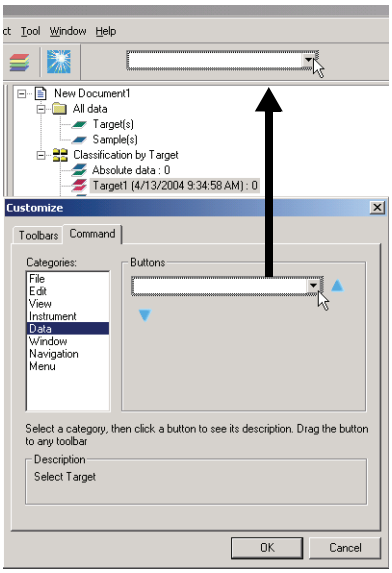
1. Select *View* - *Toolbar setup* from the menu bar.

   The Customize dialog appears.

2. Select the Command tab and select Data from the list below Categories.

3. From the Buttons area, drag and drop the Select Target box, the Previous Data button ▲ and the Next Data button▼ to the toolbar.

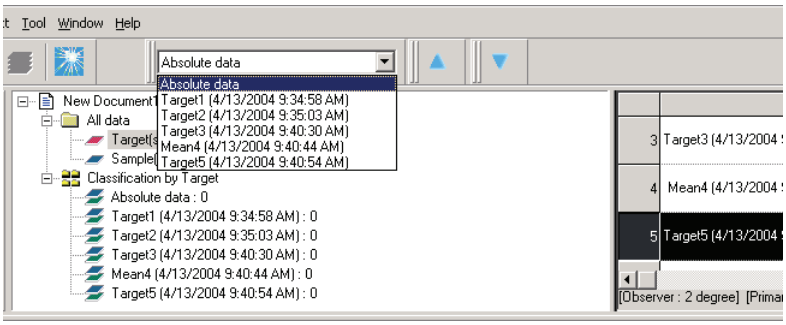
   The buttons appear in the toolbar.



Selecting data

1. In the Select Target box, select the data group you want to view.

2. Navigate through the data by clicking the ▲ or ▼ buttons in the toolbar or by selecting *Data* - *Next Data* or *Previous Data* from the menu bar.



2.8 Printing

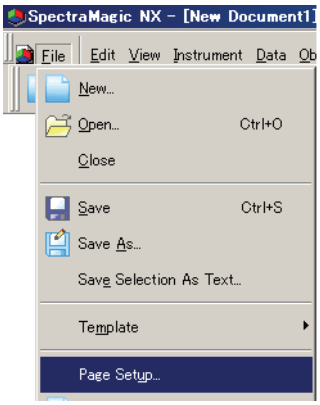
You can print the display view and printing view of the canvas window or the list in the list window.

The serial printer with guaranteed operation is DPU-H245AP-A03A. Use it in Mode B.

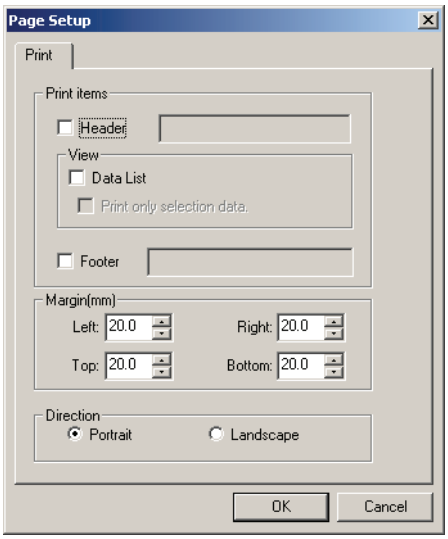
2.8.1 Page Setup

1. Select *File* - *Page Setup* from the menu bar.

   The Page Setup dialog box appears.



2. Specify the necessary settings in the Print tab.



■ Page Setup dialog box

Print items

Header
Specify whether to include a header in the printed document. To print a header, enter the string to be printed as a header.

Data List
When this option is checked, the list data displayed in the list windows is printed. When this option is unchecked, the contents of the currently selected canvas window are printed.

Print only selection data
Select this option to print the selected data only.

Footer
Specify whether to include a footer in the printed document. To print a footer, enter the string to be printed as a footer.
You can specify whether the text to be printed as a header or footer is determined automatically during printing.
The characters in the table below are recognized as special symbols and are replaced with corresponding character strings.

String	Corresponding data
$D	Day of measurement
$M	Month of measurement
$Y	Year of measurement
$h	Hour of measurement
$m	Minute of measurement
$s	Second of measurement
$OBS	Observer specified to SpectraMagic NX for printing
$ILL1	Primary illuminant specified to SpectraMagic NX for printing
$ILL2	Secondary illuminant specified to SpectraMagic NX for printing
$ILL3	Tertiary illuminant specified to SpectraMagic NX for printing
$FNAME	Name of an active file of SpectraMagic NX for printing

Enter a combination of these characters in the text box. Up to 60 alphanumeric characters can be used.

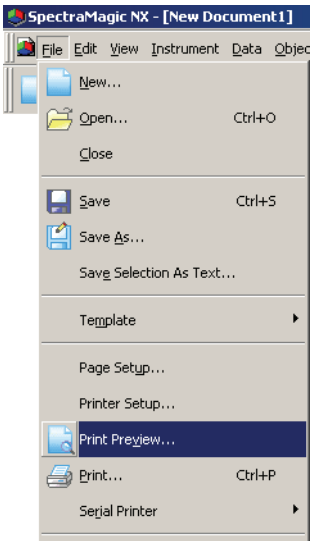
Margin
When printing the list window, specify the Top/Bottom and Right/Left margins. The Right/Left margins can be specified within the range of 0 to 50 (mm), and the Top/Bottom margins can be specified within the range of 5 to 50 (mm). The margin setting determines the position of the margin line displayed in the canvas window (see page 17). Use the line as a guide when placing graphic objects.

Direction
Portrait: Windows are printed in portrait orientation.
Landscape: Windows are printed in landscape orientation.

2.8.2 Print Preview

1. Select *File* - *Print Preview* from the menu bar.

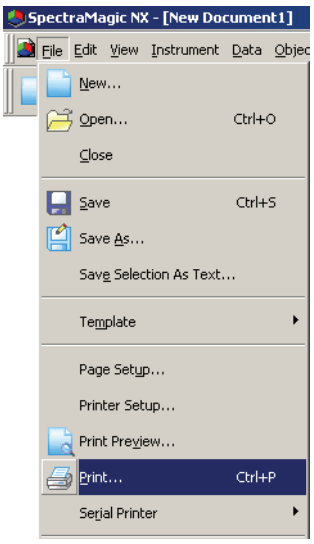
A preview window appears showing the actual appearance of the page to be printed as specified in the Page Setup dialog box.



2.8.3 Start Printing

1. Select *File* - *Print* from the menu bar.

The Print dialog box appears.

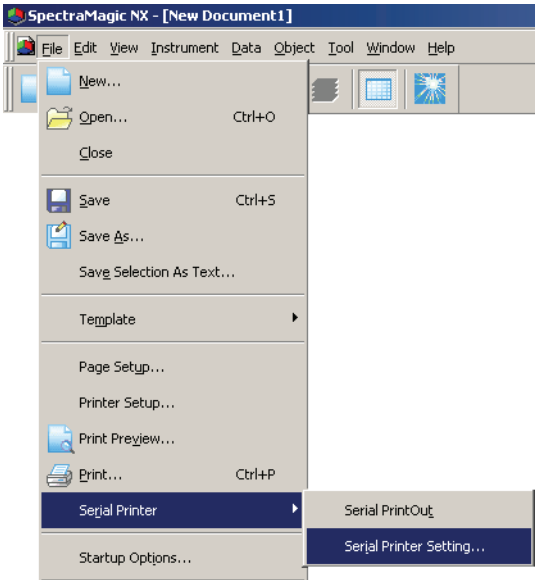


2.8.4 Serial Printing

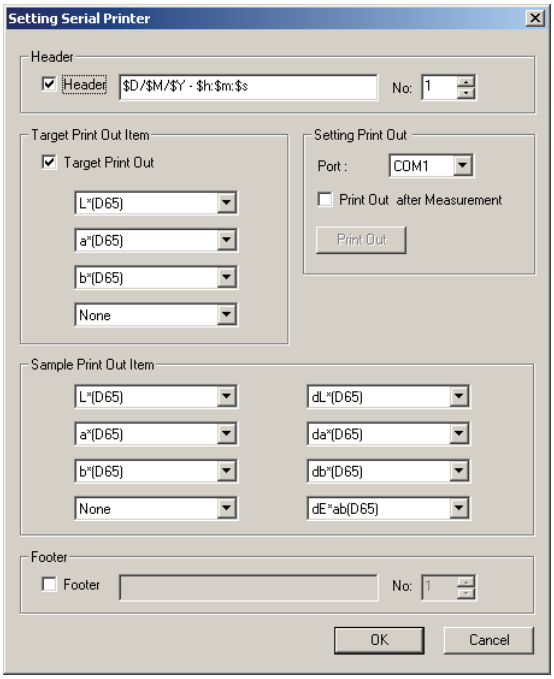
You can connect a serial printer and print data after every measurement.

1. Select *File* - *Serial Printer* - *Serial Printer Setting* from the menu bar.

The Setting Serial Printer dialog box appears.



2. Specify the necessary items.



■ Setting Serial Printer dialog box

Header

Header
Specify whether to print a header. To print a header, specify the character string to be printed as a header.

Setting Print Out

Port
Select a port to connect a serial printer from the combo box.

Print Out button
When this button is clicked, the sample currently selected or the target data is printed.

Print Out after Measurement
When this option is checked, the data is output to the serial printer after every measurement.

Target Print Out Item

Target Print Out
Specify whether to print target data.
When this option is checked, you can select the item to be printed.

Sample Print Out Item

Select the item to be printed from the list.

Footer

Footer
Specify whether to print a footer. To print a footer, specify the character string to be printed as a footer.

You can specify that the text to be printed as a header or footer is determined automatically during printing.
The characters in the table below are recognized as special symbols and are replaced with corresponding character strings.

String	Corresponding data
$N	Number specified in the edit box on the right
$D	Day of measurement
$M	Month of measurement
$Y	Year of measurement
$h	Hour of measurement
$m	Minute of measurement
$s	Second of measurement

Enter a combination of these characters in the text box. Up to 27 alphanumeric characters can be used.

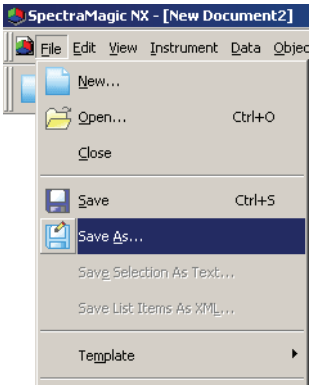
2.9 Saving Data

2.9.1 Saving a Data File

The content displayed in the list window or canvas window is saved as a document file.

1. Select *File* - *Save As* from the menu bar.

   The Save As dialog box appears.



2. Specify the filename and other items and save the data.

   The data is saved as a data file in the original file format of the SpectraMagic NX software (with the ".mes" file extension).

   The data file contains the following data:
   - Sample data
   - Target data
   - Observer, illuminant
   - Initial tolerances
   - Judgement display setting
   - List items specified in the list window
   - Graphic objects pasted in the canvas window and their size and position information
   - View setting parameters

2.10 Other Functions

2.10.1 Template File

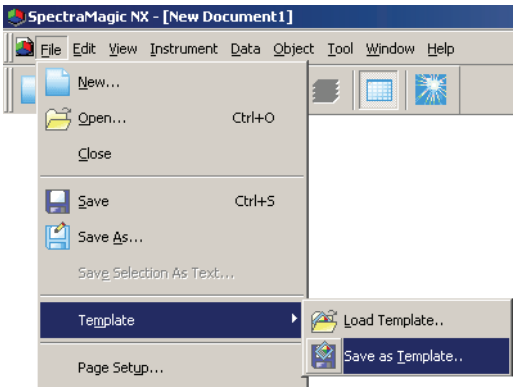
The SpectraMagic NX software provides template files in its original file format (with the ".met" file extension). A template file contains the following data:

- Observer, illuminant
- Initial tolerances
- Judgement display setting
- List items specified in the list window
- Graphic objects pasted in the canvas window as well as their size and position information
- Screen properties

Once you have saved the template files with the procedure described below, you can simply open the template file with the SpectraMagic NX software and it will open consistently in the same view.

1. Select *File* - *Template* - *Save as Template* from the menu bar.

   The Save As dialog box appears.



2. Select "Template" as the location to save to, type a filename in the Filename box and click the Save button.

   The file is saved as a template file in the SpectraMagic NX software's proprietary file format (with the ".mtp" file extension).
   The saved template file is displayed on the Template Window only after SpectraMagic NX is restarted.

The SpectraMagic NX software includes the following template files as standard:

Simple:

Opens a window in simple view as specified in the "Welcome to SpectraMagic NX" dialog box. This view is suitable for beginners using QC operations involving color measurement such as displaying data in the color coordinate system.

Standard:

Opens a window in standard view as specified in the "Welcome to SpectraMagic NX" dialog box. This view is suitable for standard QC operations such as color difference judgement or displaying a trend chart.

Detail:

Opens a window in detailed view as specified in the "Welcome to SpectraMagic NX" dialog box. This view allows for data analysis such as spectral data display and statistical calculation. This view is suitable for an R&D environment.

SCISCE:

This view is suitable for measurement with specular component SCI+SCE. This display view is not displayed in the “Welcome to SpectraMagic NX” dialog box.

In addition to above, templates specifically designed for each instrument are included.

■ Directory structure of the SpectraMagic NX software

The SpectraMagic NX software is installed in a folder having the following directory structure.

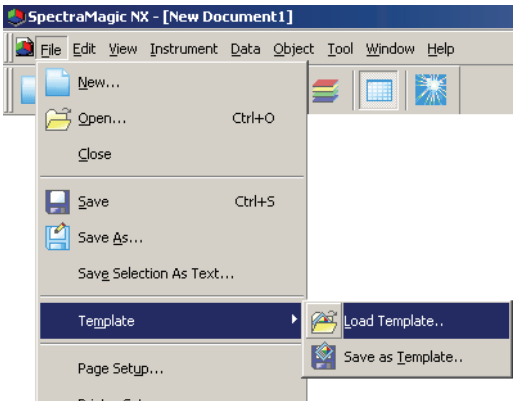
KONICAMINOLTA
- CM-S100w .....SpectraMagic NX-executable files and other files used for execution
  - Color .....Files related to the “Tips on Colors” pages
  - Navigation.....Files related to the Navigation window
  - PIC .....Image files used by SpectraMagic NX
  - Template .....Template files
- Common .....Files related to graphic objects

When you create a template, save it in the Template folder mentioned above.

2.10.2 Reading a Template File

You can change the window view by reading a template file previously created or included with the SpectraMagic NX software.

1. Select *File* - *Template* - *Load Template* from the menu bar.
   The Open dialog appears.



2. Select a template file and click the Open button.

   You can also load a template file by double-clicking the template icon in the Template Window.

To customers upgrading to the current version of the SpectraMagic NX (CM-S100w) from a former version

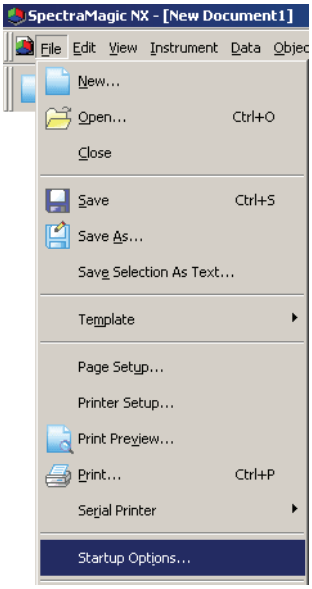
Template files created with Ver. 1.2 does not include tolerance. Consequently, when a template file created with Ver. 1.2 is opened with the current version, for which tolerance is specified, the specified tolerance becomes invalid.

2.10.3 Setting Startup Options

You can specify whether to open a template file and whether to connect the instrument when the SpectraMagic NX software is started.

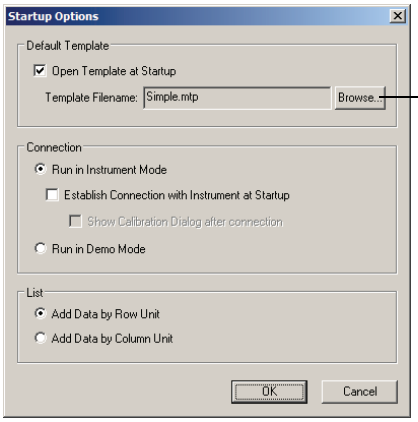
1. Select *File* - *Startup Options* from the menu bar.

The Startup Options dialog box appears.



2. Specify the start options.

Your selection will take effect at the next startup.



■ Startup Options dialog box

Default Template

Open Template at Startup

When this option is checked, the file specified in Template Filename will open at startup. When the SpectraMagic NX software is started for the first time, the window specified in the “Welcome to SpectraMagic NX” dialog box is set as the default template.

Browse button

Click the Browse button to select a template file.

Connection

Run in Instrument Mode

When this option is checked, SpectraMagic NX starts in the 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.

Show Calibration Dialog after connection

When this option is checked, the calibration dialog box appears after the connection is established.

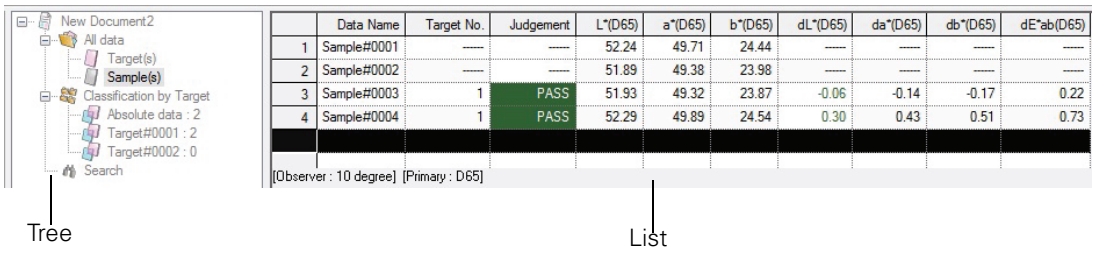
Run in Demo Mode

When this option is checked, the SpectraMagic NX software starts in demo mode. In demo mode, the SpectraMagic NX software can be operated as if the instrument were connected even when the instrument is not actually connected. When you attempt to take a measurement, a random measurement result is displayed.

List

Add Data by Row Unit

Each sample data is displayed in one row in the list window. Up to 5000 pieces of data can be stored in a document file.
This is the default setting.

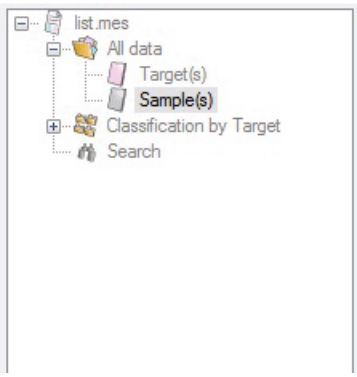


	Data Name	Target No.	Judgement	L*(D65)	a*(D65)	b*(D65)	dL*(D65)	da*(D65)	db*(D65)	dE*ab(D65)
1	Sample#0001	-----	-----	52.24	49.71	24.44	-----	-----	-----	-----
2	Sample#0002	-----	-----	51.89	49.38	23.98	-----	-----	-----	-----
3	Sample#0003	1	PASS	51.93	49.32	23.87	-0.06	-0.14	-0.17	0.22
4	Sample#0004	1	PASS	52.29	49.89	24.54	0.30	0.43	0.51	0.73

[Observer : 10 degree] [Primary : D65]

Add Data by Column Unit

Each sample data is displayed in one column in the list window. Up to 4000 pieces of data can be stored in a document file.



	1	2	3	4
Data Name	Sample#0001	Sample#000	Sample#000	Sample#0
Target No.	-----	-----	1	1
Judgement	-----	-----	PASS	PASS
L*(D65)	52.24	51.89	51.93	52.29
a*(D65)	49.71	49.38	49.32	49.89
b*(D65)	24.44	23.98	23.87	24.54
dL*(D65)	-----	-----	-0.06	0.30
da*(D65)	-----	-----	-0.14	0.43
db*(D65)	-----	-----	-0.17	0.51
dE*ab(D65	-----	-----	0.22	0.73

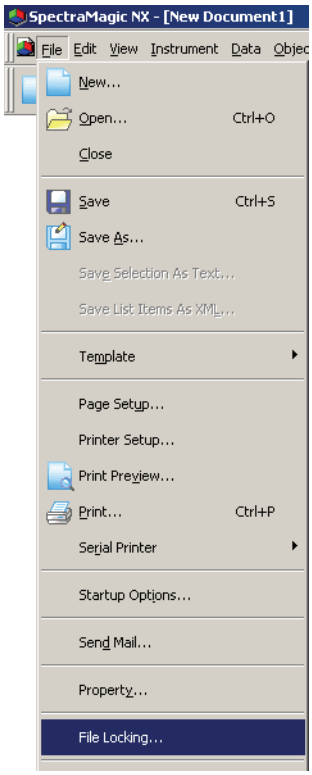
[Observer : 10 degree] [Primary : D65]

2.10.4 Locking Files Ⓟ

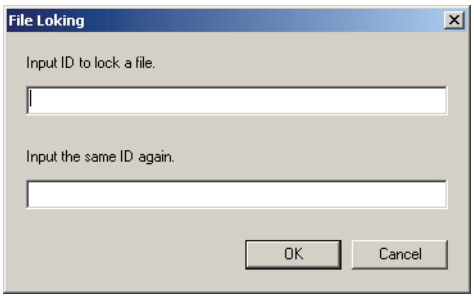
This function is supported by the SpectraMagic NX Professional Edition only.

You can set a lock to an opened document file to disable the ability to edit the template.

1. Select *File* - *File Locking* from the menu bar.



The File Locking dialog box appears.



2. Enter ID for the file twice to disable edit operations and click the OK button.

3. Save the document file.

When an attempt is made to edit a template in a file-locked document file (an attempt to enter edit mode), a dialog box appears requiring the input of the ID. If the typed ID does not match the specified one, template cannot be editied.

2.10.5 Security Functions Ⓟ

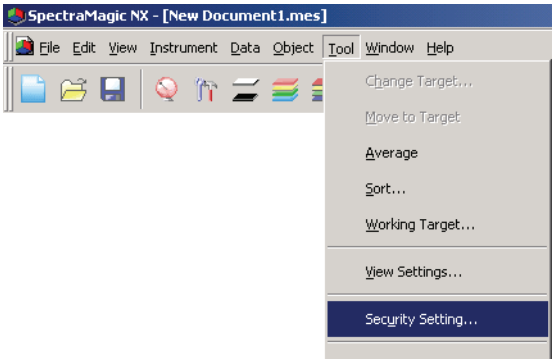
This function is supported by the SpectraMagic NX Professional Edition only.

You can set the SpectraMagic NX so that only users registered in advance can use it.
You can record, as history data, which registered user does what operation and when.

2.10.5-a Enabling the Security Functions

1. Select *Tool* - *Security Setting* from the menu bar.

The Security Setting dialog box appears.



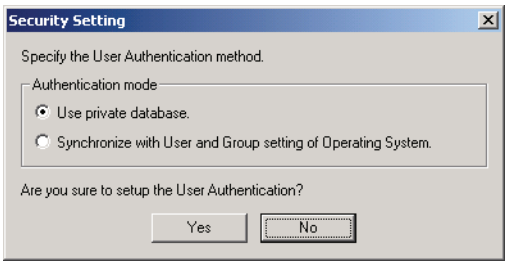
2. Select the user management method and click the Yes button.

When “Use private database” is selected, the SpectraMagic NX manages a user database independently that is specified by selecting *Tool* - *Security* - *User Manager*.

When “Synchronize with User and Group setting of Operating System” is selected, the user management settings specified to the operating system are applied.

Note: DO NOT select this setting unless you are logged in as an Administrator on the computer being used. If this setting is selected by someone who is not logged in as an Administrator, it will immediately become impossible for SpectraMagic NX to be operated except by someone logged in as Administrator.

When “Use private database” is selected, the Add New User dialog box appears.



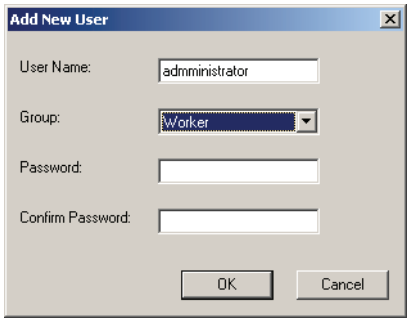
3. In the Add New User dialog box, register a user and click the OK button.

To register a user for the first time, “Administrator” is displayed for the group.

“Security Setting” under the Tool menu in the menu bar changes to “Security”.

The “Security” option has a sub menu containing “User Manager”, “Restriction”, “Audit Trail” and “Security Option”.

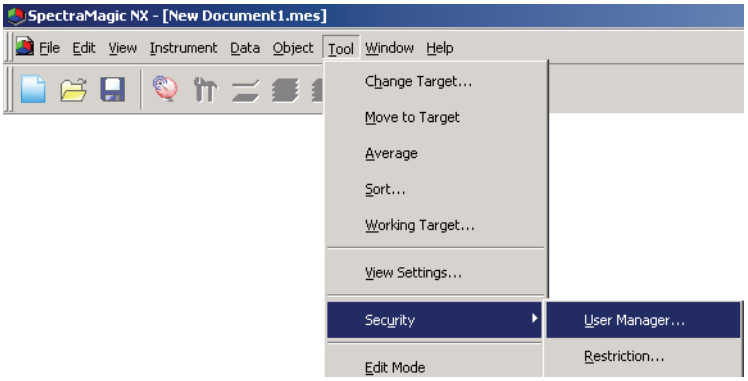
These sub menu options can only be operated by a user with administrator privilege.



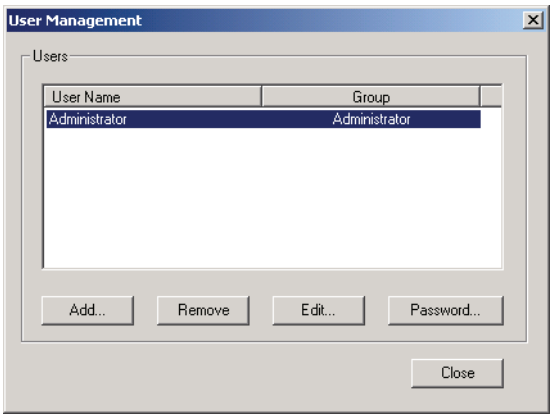
2.10.5-b Managing the User Database

1. Select *Tool* - *Security* - *User Manager* from the menu bar.

The User Management dialog box appears.



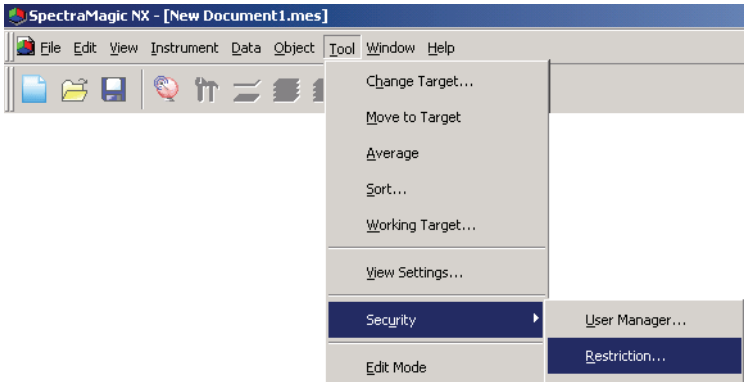
2. Register new users or edit the existing users.



2.10.5-c Setting the Operation Limit for Each User Group

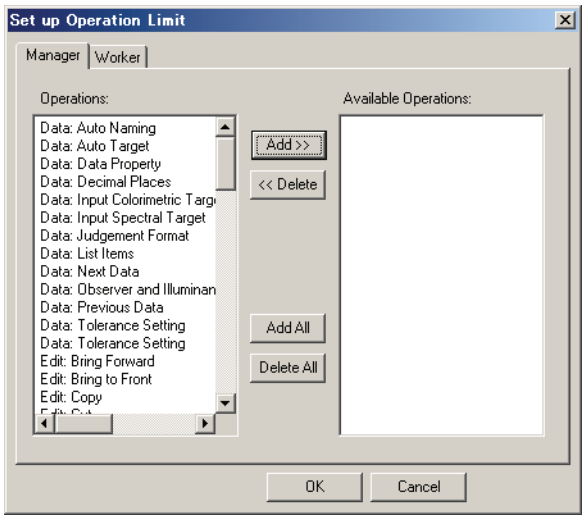
1. Select *Tool* - *Security* - *Restriction* from the menu bar.

The Set up Operation Limit dialog box appears.



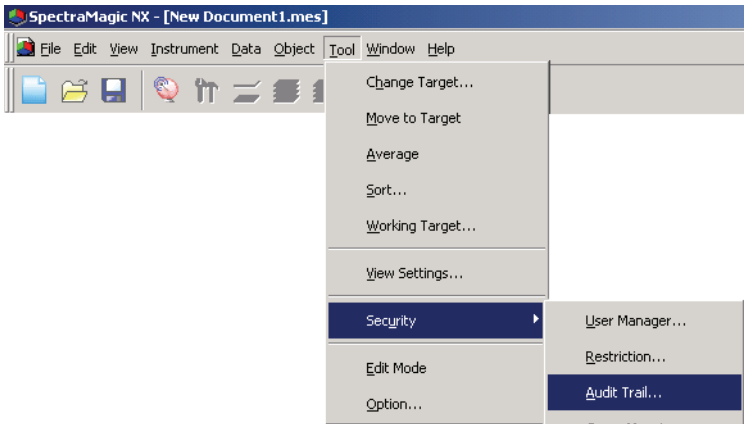
2. Select a user group by clicking the Manager and Worker tabs and specify the operations allowed to each group.

The users in the Administrator group can perform all operations displayed under “Operations”.

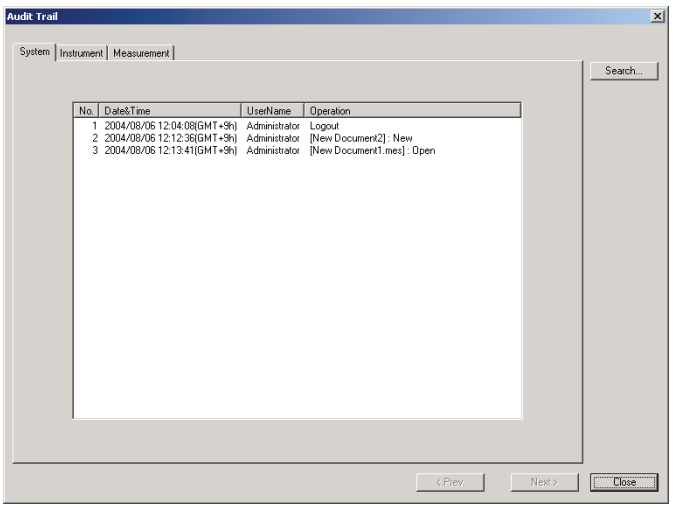


2.10.5-d Showing the Audit Trail

1. Select *Tool* - *Security* - *Audit Trail* from the menu bar.



The Audit Trail dialog box appears.



The following items are recorded on each tab.

System tab

Start, end, create new file, file read, file save

Instrument tab

Change of measurement conditions, UV adjustment, calibration data read, instrument initialization, calibration

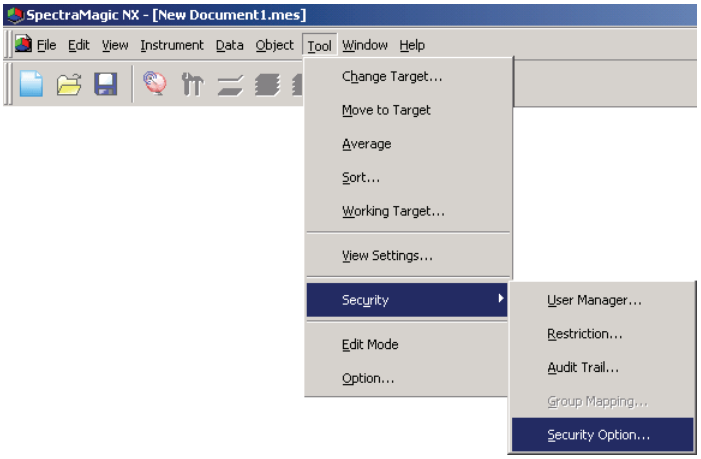
Measurement tab

Data add/delete operations such as target measurement, measurement, or data reading.

2.10.5-e Setting the Security Functions

1. Select *Tool* - *Security* - *Security Options* from the menu bar.

The Security Options dialog box appears.



2. Specify the parameters of the security functions.

■ Security Option dialog box

Illegal Access Handling tab (When "Use private database" is selected in the Security Setting dialog box)

Set the function that enables the system to determine unauthorized access and notify the administrator with an e-mail when a log-in attempt fails several times.
This option can be used when the server specified with "E-mail setting" and subsequent parameters supports this function.

Send e-mail to administrator when illegal access is detected

Set whether to use the unauthorized access prevention function.

When this option is checked, the parameters under "E-mail setting" can be entered.

Number of authentication failure

When the unauthorized access prevention is enabled, specify the limit number of log-in authorization failures.

When successive log-in attempts fail and exceed the specified limit number, the system sends an e-mail to the address specified in "Destination setting" to notify of the unauthorized access.

Audit Trail tab

Specify the parameters of the history file to record the operation history of the SpectraMagic NX.

Location of log files

Specify the location to store the history file in the Storing Location dialog displayed by clicking the Browse button.

When history is saved with the NTFS file system

The destination is limited by the OS.

Read the instruction manual for your OS carefully before specifying the destination. History may not be properly saved depending on the destination.

The default destination is the shared folder.

Maximum size of log file

Specify the maximum capacity of the history file.

When the history data exceeds the maximum capacity, a new history file is created.

Maximum number of records in log file

Specify the number of records to be displayed when showing the history.

The number of records to be displayed represents the total number of the records displayed on the three tabs: System, Instrument and Measurement.

Password Management tab (When "Use private database" is selected in the Security Setting dialog box)

Specify the effective period of the user password.

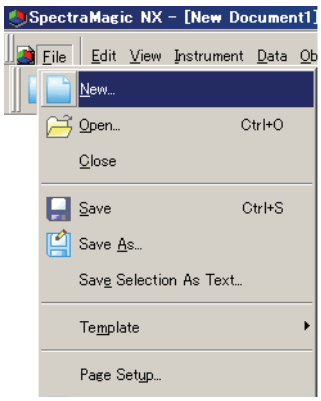
When the effective period counted from the user registration ends, the user is prompted to change the password at startup.

2.10.6 Creating a New Data File

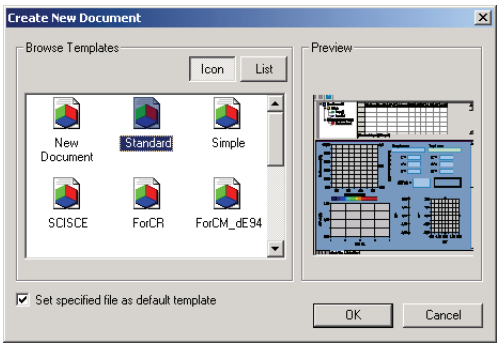
You can create a new document file (data file) for storing sample data by selecting a template file previously created or included with the SpectraMagic NX software. You can also change the window view.

1. Select *File* - *New* from the menu bar.

The Create New Document dialog box appears.



2. Select a template file and click the OK button.



■ Create New Document dialog box

Browse Templates

When a template filename is selected, a preview of the file is displayed in the right pane.

Set specified file as default template

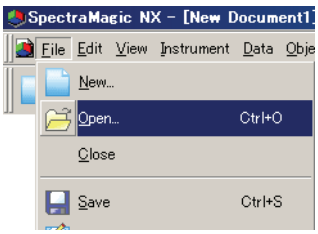
When this option is checked, the template file you selected will open the next time the SpectraMagic NX software is started.

2.10.7 Opening a Data File

In addition to the data files created with the SpectraMagic NX, you can open the data files created with the existing color data software (SpectraMagic Ver.3.6, SpectraMagic Ver.3.3, or ChromaMagic) and those saved with the CM-5/CR-5 through the USB connection (.bdt).

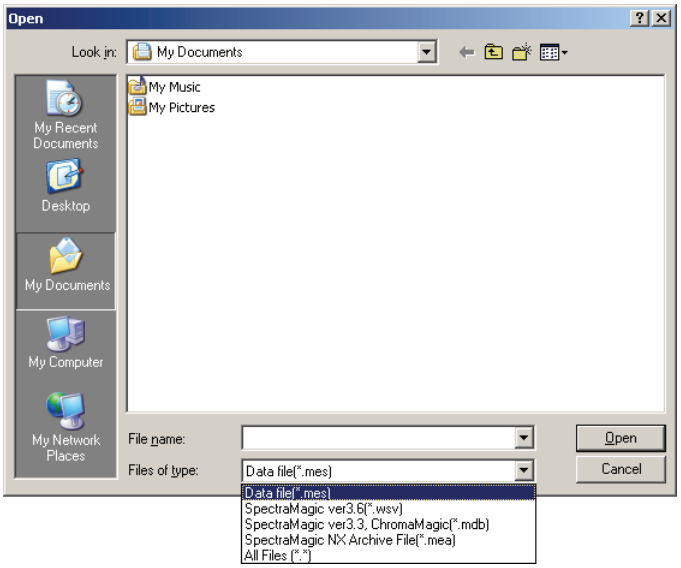
1. Select *File* - *Open* from the menu bar.

The Open dialog box appears.



2. Select the type of file to be opened.

The file names of the specified file type are displayed.



3. Select the desired file and click the Open button.
Up to 20 files can be selected and opened simultaneously.

When the data file created with SpectraMagic Ver.3.6 or SpectraMagic Ver.3.3 is opened

When the data file created with SpectraMagic Ver.3.6 (.wsv) or SpectraMagic Ver.3.3 (.mdb) is selected and the Open button is clicked, the file is converted into a data file in SpectraMagic NX format (.mes). Then, the converted file is opened.

■ When the file in SpectraMagic Ver.3.6 format (.wsv) is opened

The file converted into mes is created in the folder of the selected original wsv file with the same file name. Then, the converted file is opened.
When a wsv file with the same name already exists in the folder, a tilde is prefixed to the name of the converted file. The number of tildes is not limited as long as files of the same name exist.

■ **When the file in SpectraMagic Ver.3.3 format (.mdb) is opened**

One mdb file can record two or more records. After the conversion, mes files are created by the number of records in the file. In the folder of the original mdb file, a new folder with the same name as the original mdb file is created, and the files converted into mes are created in the new folder. The name of the mes files are the same as each record name for reflectance data and are in the form of "record name (Tra)" for transmittance data. If, however, characters not allowed to be used in a file name in Windows (/, :, etc.) are included in the original record name, such characters are omitted from the file name. When a mdb file with the same name already exists in the folder, a tilde is prefixed to the name of the converted file. The number of tildes is not limited as long as files of the same name exist.

An mdb file can store up to 200 characters for a comment, but an mes file can only store up to 80 characters. Consequently, the 81st and following characters will be deleted after the conversion.

After two or more mes files are created, the Open dialog box appears. Specify the file to be opened.

■ **When a data file of 6 banks is opened**

When the CM-3600d or CM-2600d is used for measurement, SpectraMagic Ver.3.6 and SpectraMagic Ver.3.3 can create a file with data of 6 bank statuses (SCI/100%, SCI/0%, SCI/adjust, SCE/100%, SCE/0%, and SCE/adjust). Since the SpectraMagic NX can create a data file with a maximum of 3 banks, when a file with 6 banks is converted into an mes file, the target or sample data is divided into 3 pieces of data. Consequently, there will be 3 types of 2-bank data such as SCI+SCE/100%, SCI+SCE/0%, and SCI+SCE/adjust. Each type of data is named "Target data name_100%", "Target data name_0%", "Target data name_adj", "Sample data name_100%", "Sample data name_0%", and "Sample data name_adj".

■ **Maximum number of data pieces for a created SpectraMagic NX file (.mes)**

Since an mes file is created by converting all data recorded in the original data file (wsv or mdb), it may contain more than 5,000 pieces of data. However, the SpectraMagic NX can record up to 5,000 pieces of data. Consequently, when a file with more than 5,000 pieces of data is opened with the SpectraMagic NX, all data can be displayed on the screen, but the data from a new measurement cannot be added.

When the data file created with ChromaMagic is opened

When the data file created with ChromaMagic (.mdb) is selected and the Open button is clicked, the file is converted into a data file in SpectraMagic NX format (.mes), and the converted file opens.

One mdb file can record the data of several illuminants. If a file contains such data, a new file is created for each illuminant.
Since SpectraMagic NX can handle a file with a maximum of 5,000 pieces of data, it divides an mdb file containing more than 5,000 pieces of data and creates data files containing 5,000 or less pieces of data.
A new folder with the same name as the original mdb file is created in the same folder as the mdb file. Files converted into mes format are created in the new folder. The mes files containing 5000 or less pieces of data are created for each illuminant and named sequentially as "chroma_1_C.mes", (a data file with 5000 or less pieces of data of illuminant C), and so on.

* An mdb file containing Munsell data cannot be read with SpectraMagic NX. Data created with color spaces other than Munsell can be converted and handled as data files in the SpectraMagic NX format.

* ChromaMagic assigns attribute XE to manually input data to indicate a device name. When such data is converted into an mes file, the attribute is converted into attribute InputXYZ.

* For data created with the L*u*v* color space, the setting of E*uv tolerance is not reflected in the converted data.

* When SpectraMagic NX is used to read the mdb file saved with ChromaMagic, the same operating system that was used to operate ChromaMagic or later is required.
* Only one comment line can be displayed in SpectraMagic NX. Therefore, if there are any line breaks in the comment assigned to a sample data, only the first line is displayed on the list. However, you can see the entire comment in the Data Property dialog box.

When the data file saved with the CM-5/CR-5 through the USB connection is opened

When the data file saved with the CM-5/CR-5 through the USB connection (.bdt) is selected and the Open button is clicked, the file is converted into a data file in SpectraMagic NX format (.mes), and the converted file opens.

When a text data file is opened Ⓟ

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

When a text-formatted data file (.txt or .csv) is selected and the Open button is clicked, the SpectraMagic NX software processes it as a file of manually entered data. The data attribute of each piece of data will be either "Manually input spectral data" or "Manually input colorimetric data". Only the data files in the following format can be opened.

The ↵ mark represents a CR (carriage return) code.

Format of spectral reflectance data

100 ↵	Version No.
REF ↵	A string which indicates that this is spectral reflectance data.
### ↵	Start wavelength (360 or 400)
### ↵	End wavelength (700 or 740)
10 ↵	Wavelength pitch (10)
39 ↵	No. of reflectance wavelengths (39 including the start and end wavelengths)
# ↵	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*** ↵	Spectral reflectance, data name Spectral data consist of three integer digits, a decimal point and three decimal-place digits. When the integer section has less than three digits, fill in the blank with 0 (zero) or a space. Data name: A name of up to 64 characters can be input. 2-byte characters can also be used. (Name can be omitted.) The spectral reflectance data and data name are delimited with a tab character when it is in text format (.txt), and with the delimiter specified in the Control Panel when it is in csv format (.csv).
[EOF]	

Format of colorimetric data

<table>
<tr><td>100 ↵</td><td colspan="2">Version No.</td></tr>
<tr><td>XYZ ↵</td><td colspan="2">A string which indicates that this is colorimetric data.</td></tr>
<tr><td>## ↵</td><td colspan="2">Observer (2 or 10)</td></tr>
<tr><td># ↵</td><td colspan="2">No. of illuminants (1, 2 or 3)</td></tr>
<tr><td>## ↵</td><td>Illuminant 1</td><td rowspan="3">Enter the following string corresponding to the illuminant.
<table><tr><th>Illuminant</th><th>String</th></tr><tr><td>A</td><td>1</td></tr><tr><td>C</td><td>2</td></tr><tr><td>D50</td><td>3</td></tr><tr><td>D65</td><td>4</td></tr><tr><td>F2</td><td>5</td></tr><tr><td>F6</td><td>6</td></tr><tr><td>F7</td><td>7</td></tr><tr><td>F8</td><td>8</td></tr><tr><td>F10</td><td>9</td></tr><tr><td>F11</td><td>10</td></tr><tr><td>F12</td><td>11</td></tr><tr><td>D55</td><td>12</td></tr><tr><td>D75</td><td>13</td></tr><tr><td>U50</td><td>14</td></tr><tr><td>ID50</td><td>15</td></tr><tr><td>ID65</td><td>16</td></tr></table></td></tr>
<tr><td>## ↵</td><td>Illuminant 2
Omit this line when illuminant 2 is not used.</td></tr>
<tr><td>## ↵</td><td>Illuminant 3
Omit this line when illuminant 3 is not used.</td></tr>
<tr><td># ↵</td><td colspan="2">No. of banks (1, 2 or 3)</td></tr>
<tr><td>#### ↵</td><td colspan="2">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.</td></tr>
<tr><td>###.### ~ ###.### Data name
↵</td><td colspan="2">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).</td></tr>
<tr><td>[EOF]</td><td colspan="2"></td></tr>
</table>

List of error codes

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

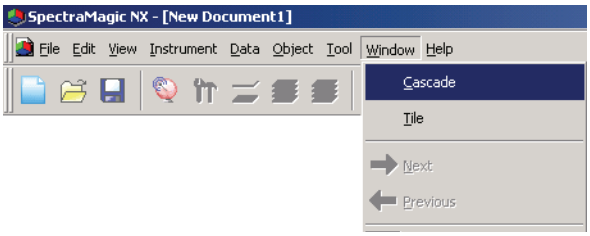
	Description
ERR 01	The version is not “100”.
ERR 02	The fixed character is not correct. The fixed character is not “REF” or “XYZ”.
ERR 03	The start wavelength is not correct.
ERR 04	The end wavelength is not correct.
ERR 05	The wavelength pitch is not correct.
ERR 06	The number of reflectance wavelengths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

2.10.8 Arranging Windows with/without Overlapping

When two or more data files are opened, you can select whether the windows are to be displayed in an overlapping or tiled arrangement.

1. Select *Window* - *Cascade* or *Tile* from the menu bar.

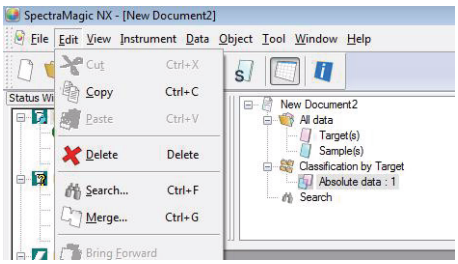
The windows are displayed in either an overlapping arrangement (Cascade) or a side-by-side arrangement (Tile).



2.10.9 Merging Multiple Data Files

When 2 or more data files are open, you can merge them into 1 file.

1. Select *Edit* - *Merge* from the menu bar.

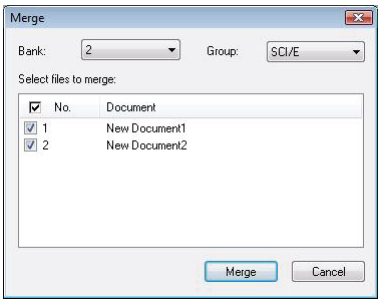


The Merge dialog box appears.

2. Select the data files to be merged, and then click the Merge button.

The Save As dialog box appears. Specify the file name and other options and save the file.
A new, merged file is created while the original data files remain.
A data file contains up to 5000 pieces of sample data.
If the number of data exceeds 5000, you cannot merge files.

■ **Merge dialog box**



Bank
Specify the number of banks. You can merge data files as long as the number of banks setting for each file is the same.

Group
When the number of banks is 2 or 3, specify the group traits. You can merge data files as long as their group traits are the same.
The data files of the specified number of banks and group traits are displayed.

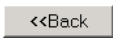
2.10.10 Starting Navigation

1. Select *Help* - *Navigation* from the menu bar.

   The HTML-formatted tutorial is displayed.

   Next 

   This button can be selected when the Navigation window is active. Click this button to have the next page appear in the Navigation window. This button appears only after the Previous command has been used. This is the same operation as selecting *Help* - *Navigation* - *Next* from the menu bar.

   Previous 

   This button can be selected when the Navigation window is active. Click this button to have the previous page appear in the Navigation window. This is the same operation as selecting *Help* - *Navigation* - *Previous* from the menu bar.

2.10.11 Viewing the Instruction Manual

1. Select *Help* - *Manual* from the menu bar.

   The instruction manual is displayed in PDF format.

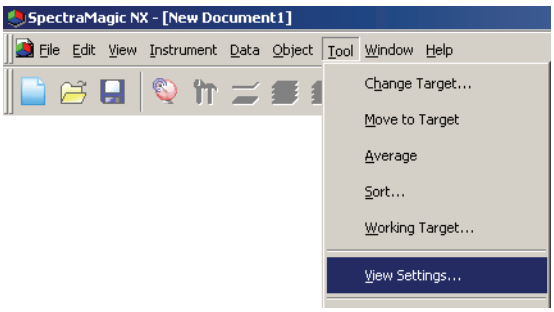
2.10.12 View Settings of Each Window

You can specify view setting details such as the background colors of the List Window, the Canvas Window (Display/Printing Views) and the Status Window.

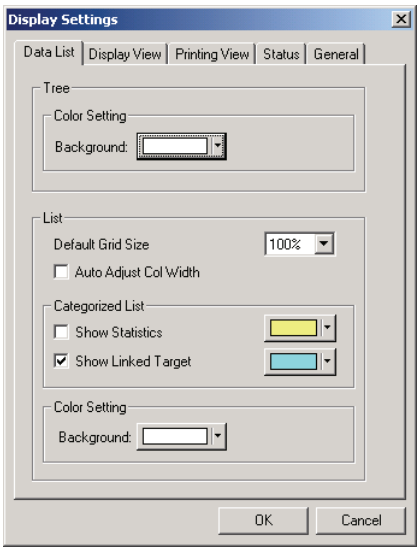
1. Select *Tool* - *View Setting*s from the menu bar.

   Or, right-click somewhere in the canvas window where no graphic object is pasted, and select View Settings from the displayed context menu.

   The Display Settings dialog box appears.



2. Specify the view setting details for each window.



■ Display Settings dialog box

Data List tab

Tree - Color Setting
Background:
Specify a background color for the tree.

List - Default Grid Size
Specify the normal size for the list display. This setting is used as the default size for Zoom In/Out display (p. 118).

Auto Adjust Col Width:
Check this option to automatically adjust the column width of the list according to the number of displayed digits.

List - Categorized List

Show Statistics:

Check this option to display statistics in the list for a data group when Classification by Target - Absolute data or Classification by Target - Target ** is selected. The color of the statistics line can be selected from the box at right.

Show Linked Target:

Check this option to display the linked target data in the list for a data group when Classification by Target - Target ** is selected. The color of the linked target line can be selected from the box at right.

List - Color Setting

Background:

Specify a background color for the list.

Display View tab, Printing View tab

Graphics Window - Color Setting

Background:

You can specify the background color of the display view.

Grid

Show Grid:

When this option is checked, a grid is displayed in the background of the window in edit mode. You can specify the color and interval of the grid using the box on the right. For the color setting method, refer to page 154.

The interval can be specified between 5 and 20 in the unit of mm.

Display Header, Footer:

When this option is checked, the header and footer appear on the view.

Display Printing Layout:

When this option is checked, the print layout lines are displayed on the background of the view. The color of the print layout lines is the same as the grid lines.

Setting items available only on the Display View tab

Status tab

Status Window - Color Setting

Background:

You can specify the background color of the status window.

General tab

Screen Mode

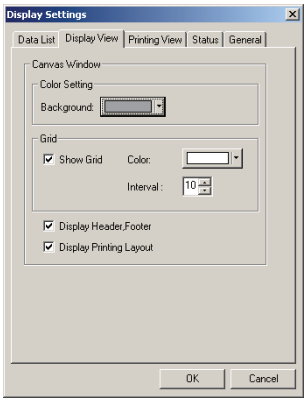
Allow editing canvas window:

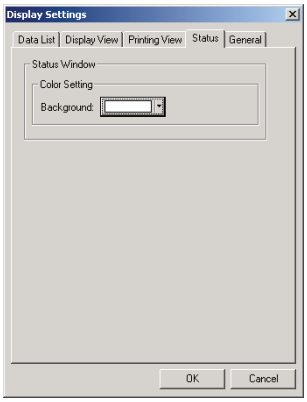
When this option is checked, the *Edit Mode* command under *Tool* in the menu bar can be selected. If this option is not checked, the edit mode and run mode cannot be switched.

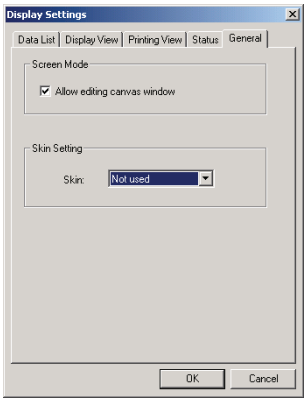
Skin Setting

Skin:

<Function reserved for future use. The current version of SpectraMagic NX shows “Not used”.>





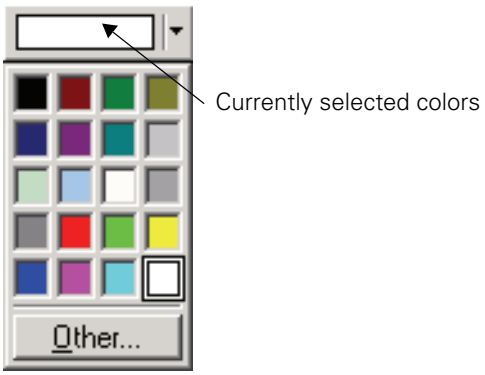


2.10.13 Color Setting

The color button appears, allowing you to select colors. 

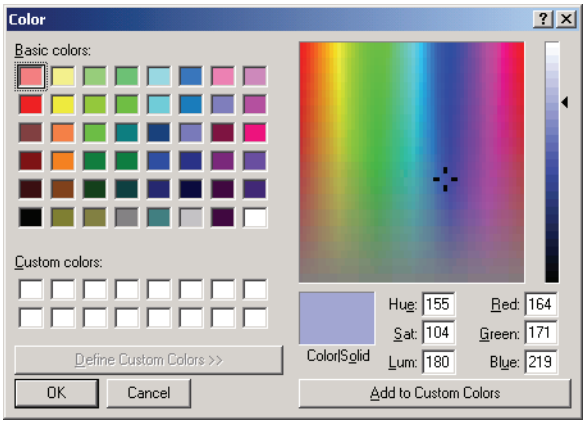
1. Click the color button.

To select a color other than those shown in the palette, click the Other button.



2. Select a color from the palette or create a desired color.

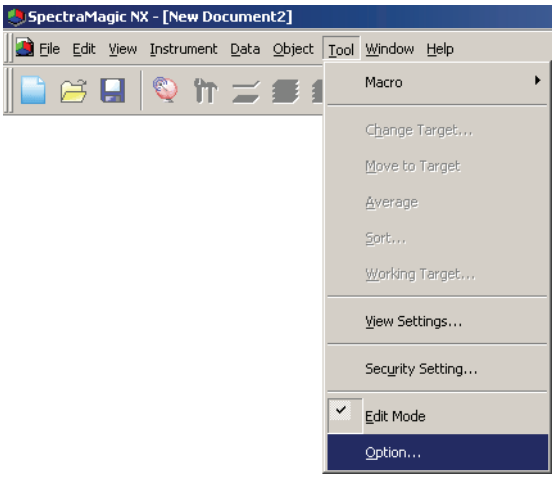
When the Other button is clicked, the Color dialog box appears.



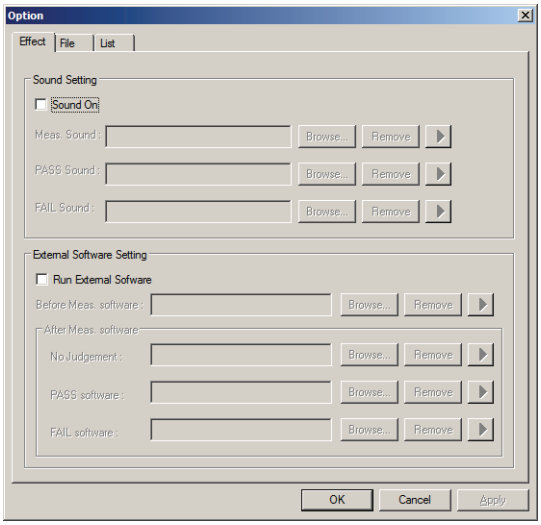
2.10.14 Setting Options

1. Select *Tool* - *Option* from the menu bar.

The Option dialog box appears.



2. Specify the sound, file-related functions, and list extension functions as necessary.



■ Option dialog box

Effect tab

Sound Setting

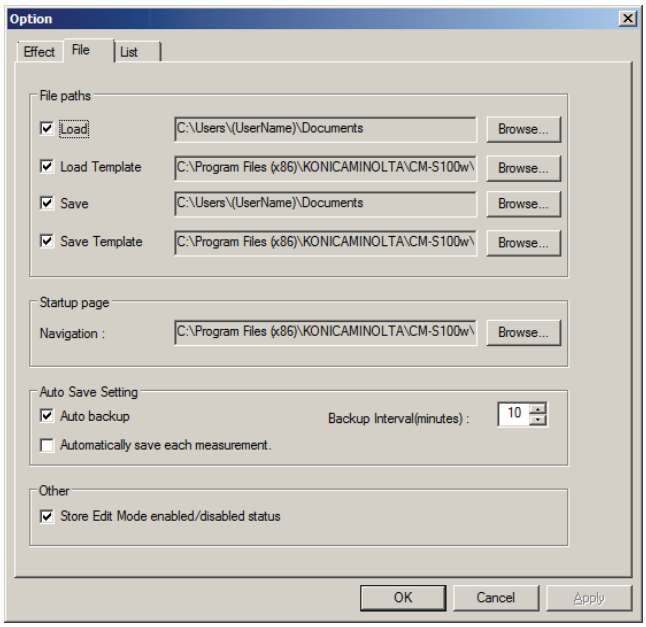
Provides sound in WAV format during measurement.
You can select a sound to be played in response to a particular result during judgement operation.

External software setting

External software can be started before or after performing the measurement and according to the measurement results.
However, the external software set in Before Meas. will not work for a remote measurement.
For interval measurement, the external software set in Before Meas. runs only one time initially. The external software set in After Meas. runs every time once the measurement is completed.

File tab

File Path Setting



Load

Specify the default file path that is displayed when *File* - *Open* is selected from the menu bar.

Load Template

Specify the default file path that is displayed when *File* - *Template* - *Read Template* is selected from the menu bar.

Save

Specify the default file path that is displayed when *File* - *Save As* is selected from the menu bar.

Save Template

Specify the default file path that is displayed when *File* - *Template* - *Save as Template* is selected from the menu bar.

When these options are checked, the specified file paths are used for corresponding occasions. When they are not checked, the file paths that were used last time are used.

Start up Page Setting

Navigation

Specify the location of the navigation start page “Index.htm”.

Auto Save Setting

Auto Save On

When this option is checked, data files are backed up automatically. The back up file names are prefixed with “~” (tilde). A limited user who logged in the OS cannot use specific file paths. In such a case, the auto save is disabled.

Automatically save each measurement

When this option is checked, data files are saved by overwriting after every measurement.

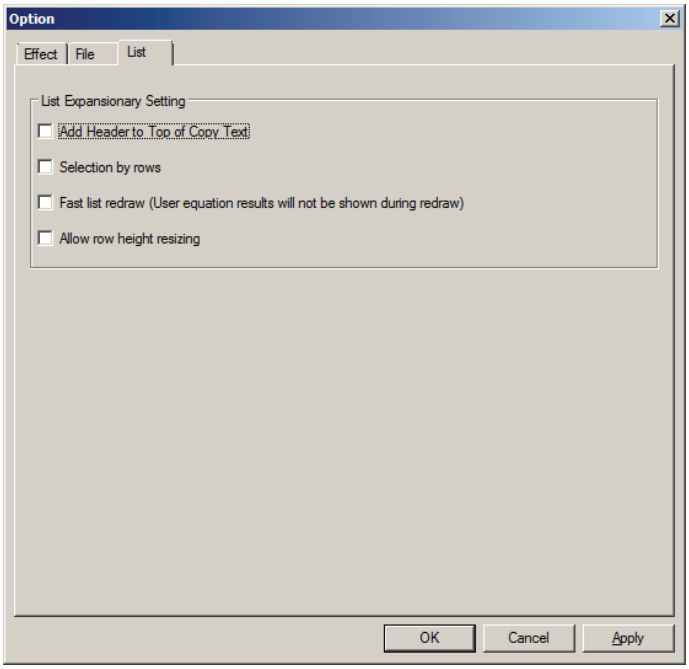
Other

Store Edit Mode enabled/disabled status

When this option is checked, the document file is saved in the current mode. When this option is not checked, the file is always saved in run mode.

List tab

List Expansionary Setting



Add Header to Top of Copy Text

When the data in the list is selected and copied while this option is checked, the characters at the beginning are also copied.

Row Select On

When this option is checked, clicking any point in the list selects the line including the point.

Fast list redraw (User equation results will not be shown during redraw)

When this option is checked, the items in the list window are displayed quickly. Note that if a user equation is set to the list item, the equation is not displayed.

This setting is not reflected until the software is restarted.

Allow row height resizing

When this option is checked, the height of the row in the list can be adjusted. This setting is not reflected until the software is restarted.

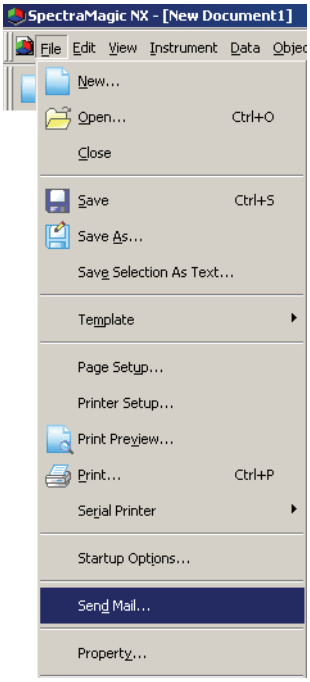
2.10.15 Sending Data Files by E-mail

A data file can be sent by e-mail as an attachment.

1. Select *File* - *Send Mail* from the menu bar.

With some e-mail software programs, a parameter setting dialog box may appear. Specify each parameter accordingly.

The window for sending E-mail appears.



2. Type the destination address and subject and send the mail.

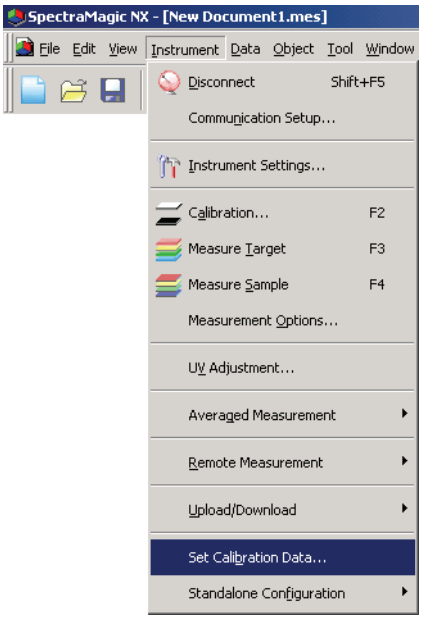
2.10.16 Downloading Calibration Data to the Instrument

This procedure is available only when the spectrophotometer or the chroma meter is connected and the protection key is attached to the computer.

You can download calibration data from the SpectraMagic NX software to the instrument. Use this function before using a new white calibration plate for the instrument or a new user calibration standard for calibration channels 01 to 19 with CR Series.

1. Select *Instrument* - *Set Calibration Data*.

The Calibration Data dialog box appears.



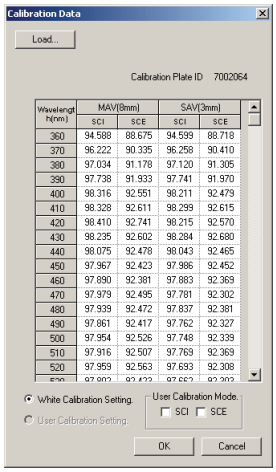
2. Specify the calibration value.
The method varies depending on the connected instrument. Refer to page 160 and 162 for details.

3. Click the OK button to start downloading the data to the instrument. If the CR-400/410 is connected, when the OK button is clicked, the calibration data is downloaded to the instrument and calibration of the selected channel is performed.

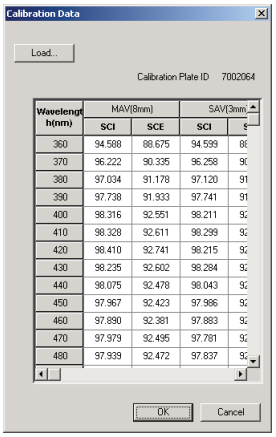
■ Calibration Data dialog box (when the CM-3000 Series, CM-2600d/2500d, CM-2500c or CM-700d/600d is connected)

When the CM-3600A, CM-3610A, CM-3600d or CM-2600d is connected, confirm that the White Calibration Setting radio button has been selected.

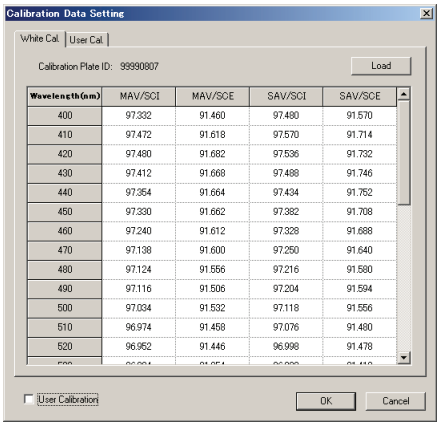
2. Click the Load button. When the dialog box for opening a file appears, specify the file containing the new white calibration data and click the Open button.



Sample display when the CM-2600d is connected



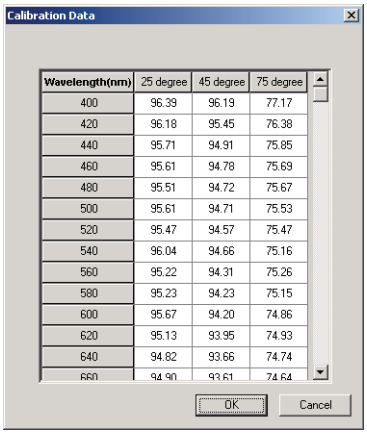
Sample display when the CM-3000 Series is connected



Sample display when the CM-700d is connected.
The User Calibration check box and the User Cal. tab are supported by the SpectraMagic NX Professional Edition only.

■ Calibration Data dialog box (when the CM-512m3A or CM-512m3 is connected)

2. Input the calibration (spectral reflectance) data.



■ Calibration Data Setting dialog box (when the CM-5/CR-5 is connected)

You cannot set (change) the calibration data for the built-in white calibration plate of the instrument. To use an external white calibration plate such as when using the optional White Calibration Plate CM-A210 for white calibration when performing Petri Dish or Mini Petri Dish measurements, refer to 2.10.18 Specifying a User Calibration Value to the Instrument Ⓟ on p.170.

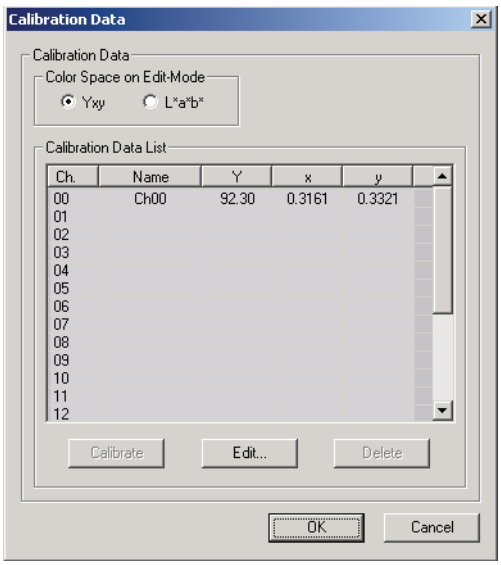
■ Calibration Data dialog box (when the CR-400/410 is connected)

2-1) Select the Color Space on Edit-Mode to use.

2-2) Select the calibration channel (Ch.) to calibrate in the Calibration Data List, and click the Edit button. The Edit Calibration Data dialog appears.

2-3) Input the calibration channel name and the calibration data.

Calibration of a channel in which calibration data have already been set can be performed by selecting the desired channel in step 2-2) above and clicking Calibrate. Calibration of the selected channel will then be performed.

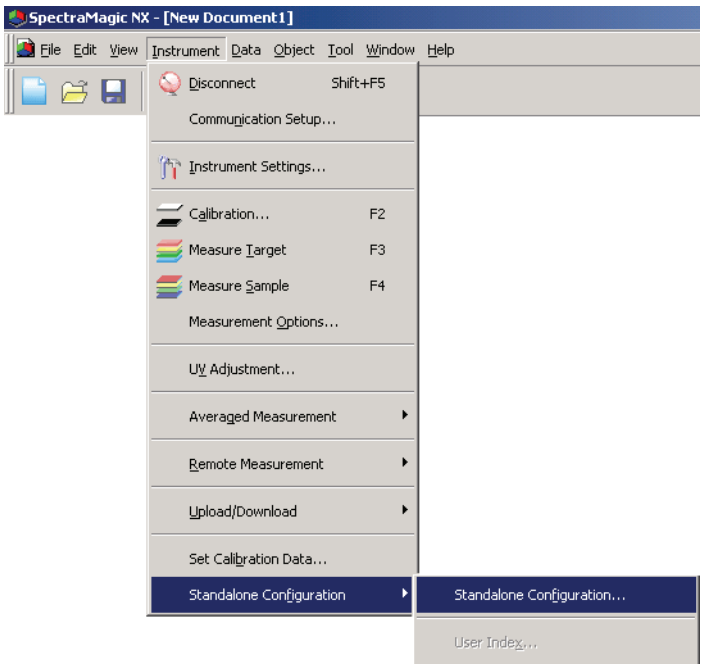


2.10.17 Downloading Configuration Data to the Instrument

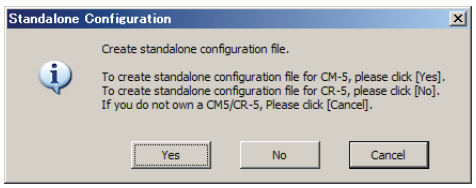
This procedure is available only when the protection key is attached to the computer.

You can use the SpectraMagic NX software to configure the instrument for standalone operation (when not connected to the computer).

1. Select *Instrument* - *Standalone Configuration* - *Standalone Configuration*.



A confirmation dialog box appears if the instrument is not connected.
To create standalone configuration file for CM-5, click Yes. To create standalone configuration file for CR-5, click No. In other cases, click Cancel, and specify instrument settings after connecting the instrument.



The Standalone Configuration dialog box appears. Click the View button to see the details of the target data with the specified number stored in the instrument, if the CM-2600d/2500d, CM-2500c, CM-512m3A or CM-512m3 is connected.

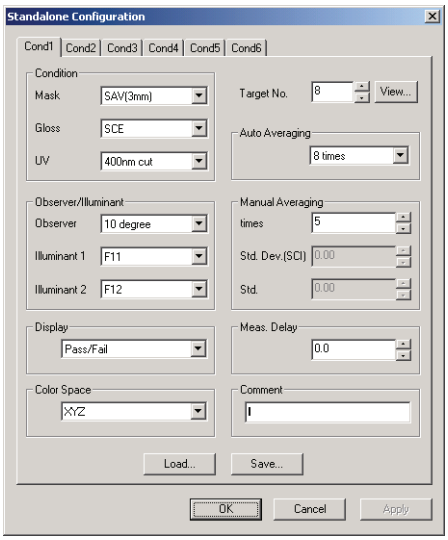
2. Specify or enter an appropriate value for each item.

The contents of the Standalone Configuration dialog box varies depending on the connected instrument. Refer to pages 164 and 169 for details.

3. Click the OK button to start downloading data to the instrument.

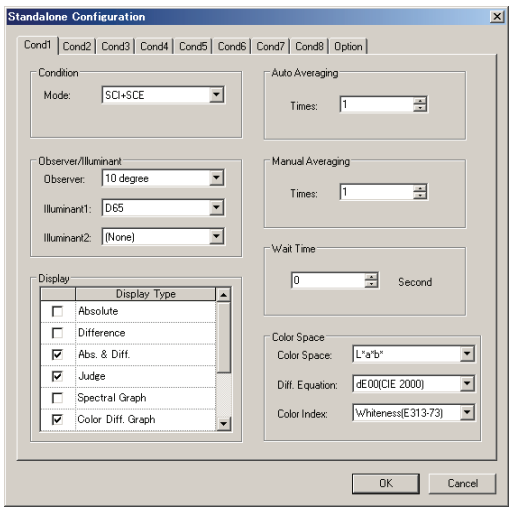
■ Standalone Configuration dialog box (when the CM-2600d/2500d is connected)

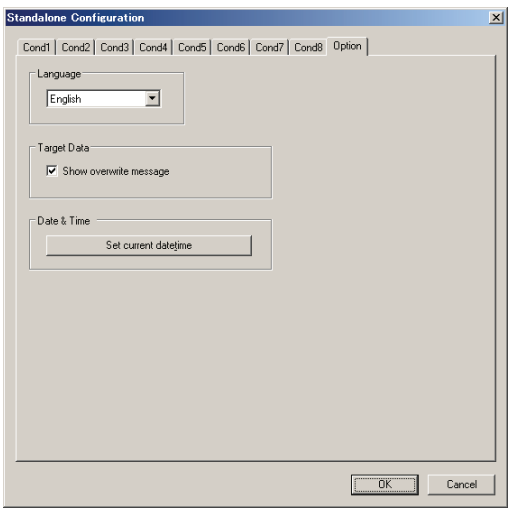
2. Specify or enter an appropriate value for each item. Or click the Load button and load the existing configuration file.



■ Standalone Configuration dialog box (when the CM-700d/600d is connected)

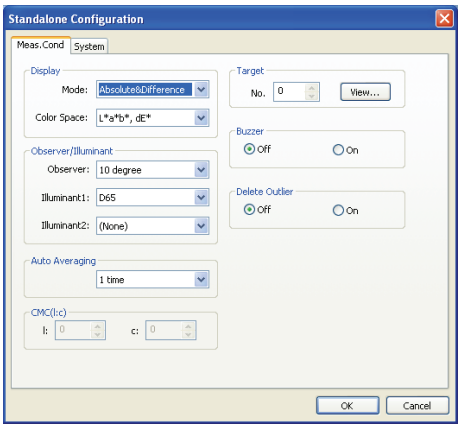
2. Specify or enter an appropriate value for each item to set measurement conditions and the instrument screen display. Select the color space(s) which will be displayed on the instrument. On the Option tab, you can specify optional items related to the instrument.

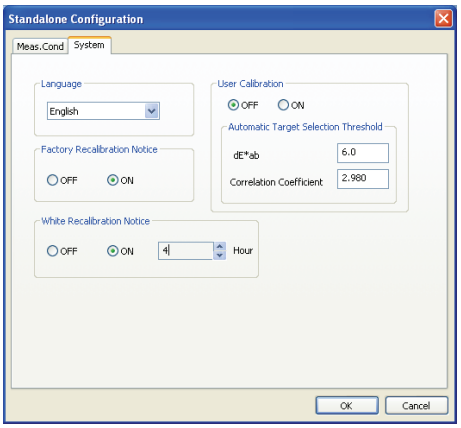




■ Standalone Configuration dialog box (when the CM-512m3A or CM-512m3 is connected)

2. Click the Meas. Condition or System tab and specify or enter an appropriate value for each item.





(The System tab is displayed only for CM-512m3A.)

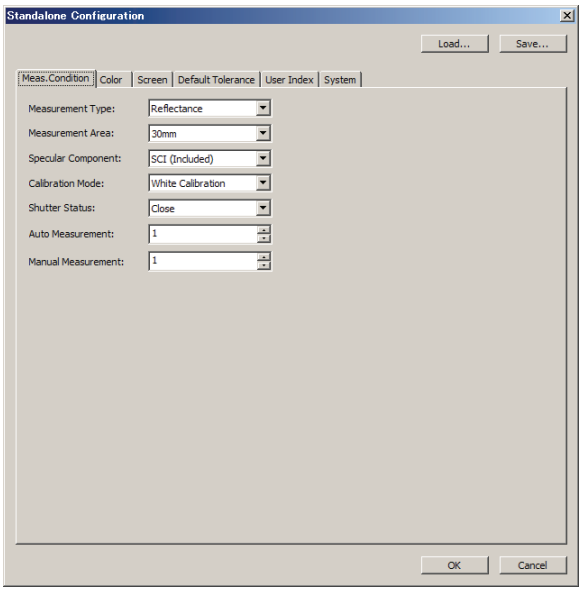
■ Standalone Configuration dialog box (for CM-5/CR-5)

Note:
Even if an instrument is not connected, Standalone Configuration data for the CM-5/CR-5 can be set and stored in a Condition file as described on page 169 for later transfer to the instrument via a USB memory device. Settings available when creating a Condition file without an instrument connected correspond to the latest firmware version of the CM-5/CR-5, which may be different than the firmware version of the instrument to which the Condition file is applied. If a setting item in the Condition file is not available on the instrument, the current instrument setting for that item will be left unchanged when the Condition file is read. Settings available in CM-5/CR-5 firmware version 1.10 and later that are not available in earlier firmware versions include:

Meas. Condition tab:
Measurement Area: “3mm” when Measurement Type: “Petri Dish”
Screen tab:
Spectral View Setting group
“Show Target” checkbox
Spectral Data Display: “Absorbance” or “Absorbance + Specific Wavelength”

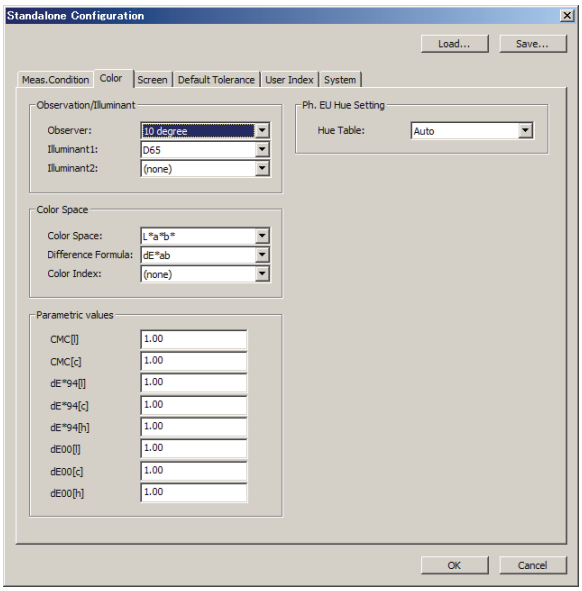
If a CM-5 or CR-5 is connected and Standalone Configuration is set directly to the instrument, only the settings applicable to the firmware version of the connected instrument will be shown.

2. Specify or enter an appropriate value for each item.
On the Meas.Condition tab, you can set the measurement conditions (Measurement Type, Measurement Area, Specular Component, etc.) for the instrument.
Ⓜ Specular Component can be set with the CM-5 only.



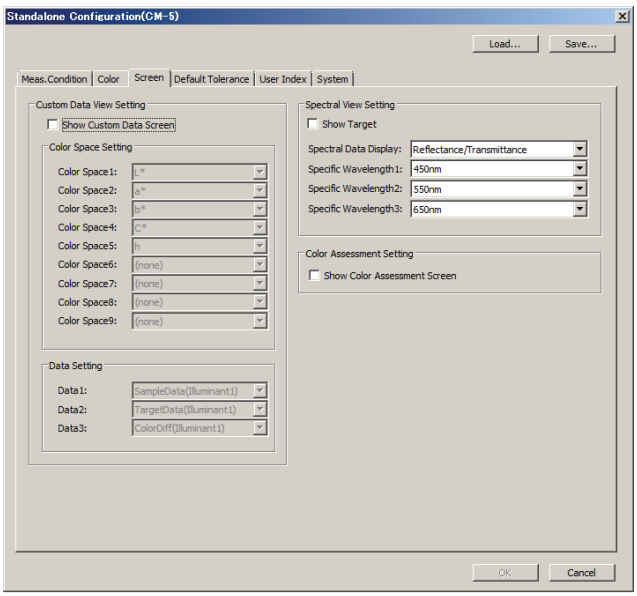
On the Color tab, you can set the observation conditions (Observer, Illuminant, Color Space, Difference Formula, etc.) to be displayed on the instrument.

Ⓜ Illuminant 2 and ISO Brightness are only available with the CM-5.



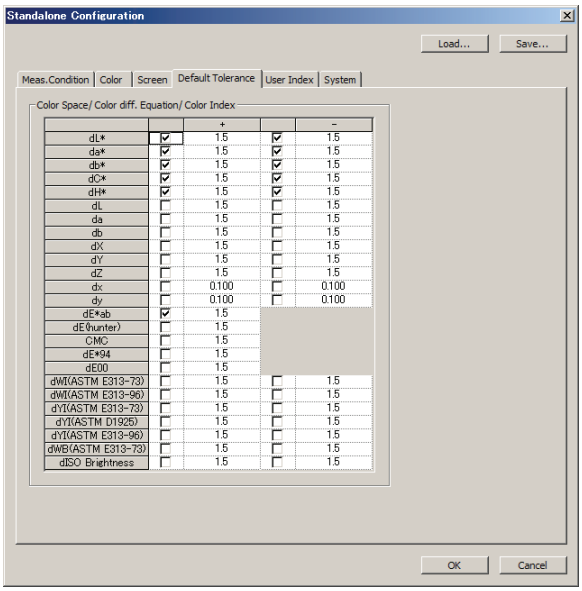
With the CM-5/CR-5, the screen display can be customized. The customization can be set up on the Screen tab.

Ⓜ Spectral View Setting is only available with the CM-5.



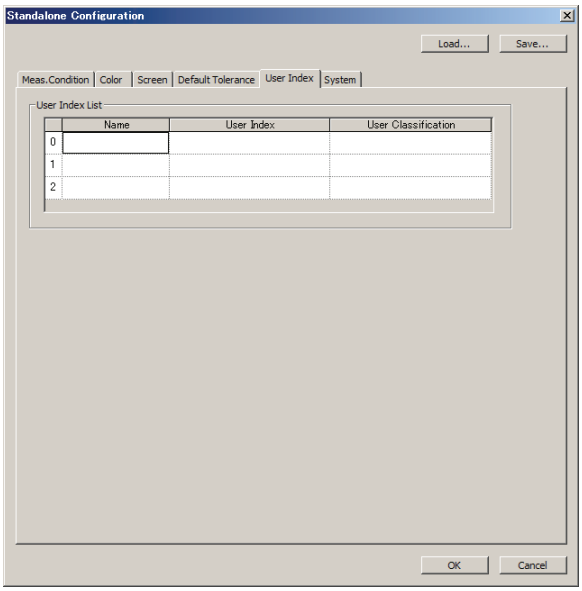
On the Default Tolerance tab, you can set the default tolerance which will be automatically set when the target color is selected with the instrument.

Ⓜ ISO Brightness is only available with the CM-5.

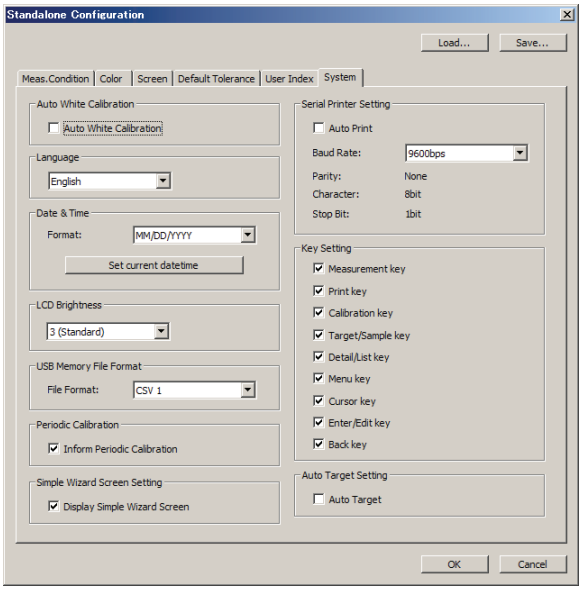


On the User Index tab, you can set up to three user-specific operational expressions based on the color space.

Ⓜ The User Index tab is only available with the CM-5.



On the System tab, you can set optional items regarding the instrument.



You can load the existing Condition file by clicking the Load button.

You can save the current setting as an Condition file by clicking the Save button. The file name cannot contain characters other than those that can be set on the instrument. Please refer to “Batch Setting of Conditions” in the instrument instruction manual.

The settings in all tabs of the Standalone Configuration dialog box are saved in one file.

You can save the Condition file you created (.cnd) on a USB memory device and attach the memory device to the USB connection terminal of the instrument to load the file. To do this, save the Condition file in the following folder.

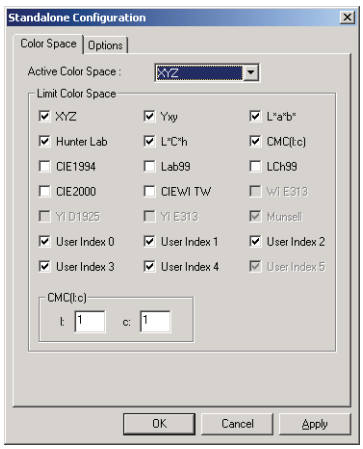
Drive:\Instrument name

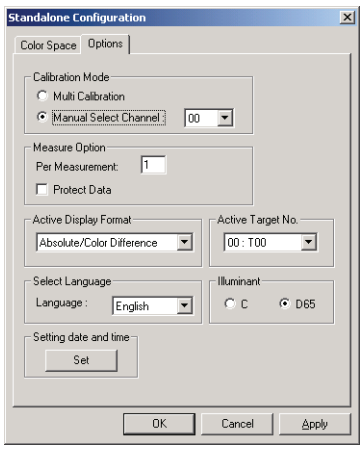
(Example) When the USB memory device is Drive F and the instrument is the CM-5:

F:\CM-5

■ Standalone Configuration dialog box (when the CR-400/410 is connected)

2. Click the Color Space or Options tab and specify or enter an appropriate value for each item.





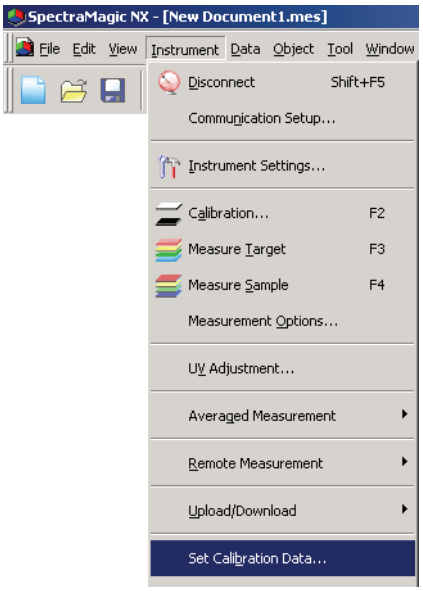
2.10.18 Specifying a User Calibration Value to the Instrument Ⓟ

This procedure is available only when the CM-3600A, CM-3610A, CM-3600d, CM-2600d, CM-700d or CM-5/CR-5 is connected and the protection key is attached to the computer.
This function is supported by the SpectraMagic NX Professional Edition only.

In addition to the white calibration, you can perform user calibration. This section describes the procedure to specify a user calibration value and to enable the user calibration.

When user calibration is enabled, a dialog for user calibration appears after white calibration during the calibration process described on page 34. If, however, the CM-5/CR-5 is connected, the user calibration described here is performed as white calibration during the calibration process described on page 34.

1. Select *Instrument* - *Set Calibration Data* from the menu bar.



The (White) Calibration Data Setting dialog box appears.

When the CM-700d is connected, select the “User Cal.” tab.

2. Set the calibration value.

The setting procedure varies depending on the model of the connected instrument. For the procedure for the individual models, refer to pages 171 to 173.

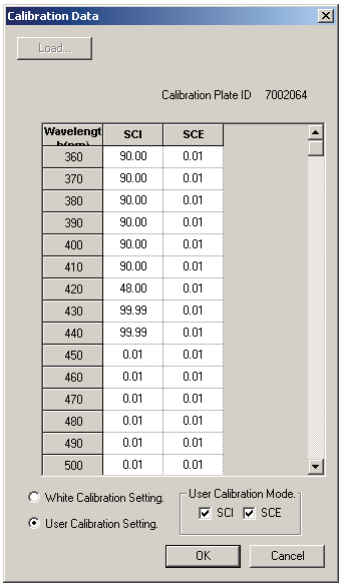
3. Clicking the OK button starts the writing to the instrument.

■ White Calibration Data dialog box (When the CM-3600A, CM-3610A, CM-3600d or CM-2600d is connected)

2-1. Check User Calibration.

When the CM-2600d is connected, check one of SCI and SCE in the User Calibration Mode frame for which you want to perform user calibration or check both.

User calibration is now enabled.



(Sample display when the CM-2600d is connected)

2-2. Select the User Calibration Setting radio button.

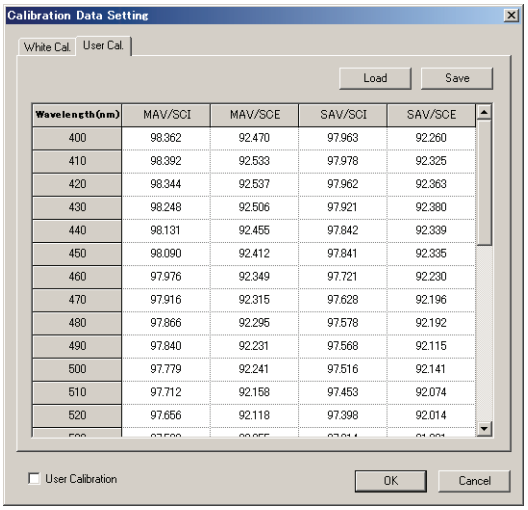
This enables entering the user calibration value into the list.

2-3. Enter the spectral reflectance to specify the calibration value.

The same calibration value is applied to all measurement areas.

■ White Calibration Data Setting dialog box (When the CM-700d is connected)

2-1. Select the User Cal. tab.



(Sample display when the CM-700d is connected)
The User Calibration check box and the User Cal. tab are supported by the SpectraMagic NX Professional Edition only.

2-2. Check User Calibration.

User calibration is now enabled.

2-3. Enter the spectral reflectance to specify the calibration value. Or, click the Load button to load the existing calibration value file and set the value.

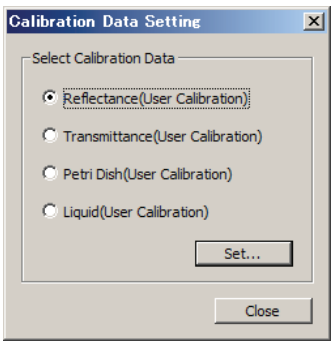
The same calibration value is applied to all measurement areas.

You can save the current value as a calibration value file by clicking the Save button.

■ Calibration Data Setting dialog box (When the CM-5/CR-5 is connected)

You can select User Calibration mode from the Meas.Condition tab on the Standalone Configuration dialog box. For details, see page 161.

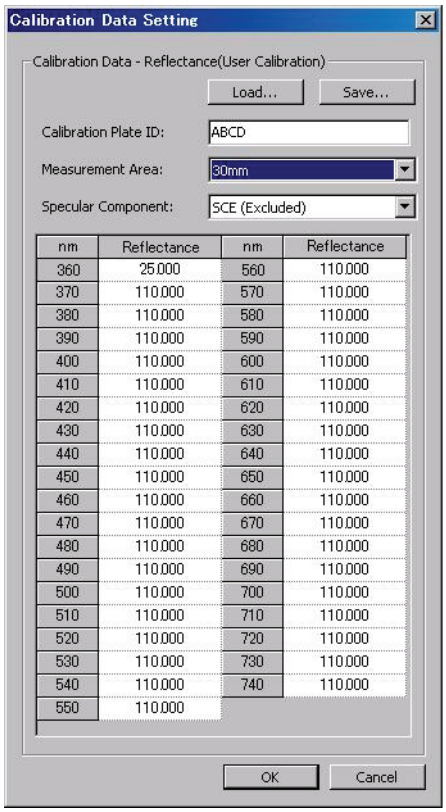
2-1. Select the type of the user calibration value to set from Select Calibration Data and click the Set button.



2-2. When you selected Reflectance(User Calibration), select the measurement area and specular component you want to set.

Selectable combinations are: LAV and SCI (Ⓜ), LAV and SCE, MAV and SCI (Ⓜ), MAV and SCE, SAV and SCI (Ⓜ), SAV and SCE.

Ⓜ Specular Component can be set with the CM-5 only.



2-3. Set the calibration value by entering spectral reflectance or spectral absorbance. Or, click the Load button to load the existing calibration value file and set the value.

When Reflectance(User Calibration) was selected, specific calibration values are applied to measurement areas individually.

You can save the current value as a calibration value file by clicking the Save button. When Reflectance(User Calibration) was selected, specific calibration value files will be generated for measurement areas individually.

2.10.19 Downloading User Index to the Instrument

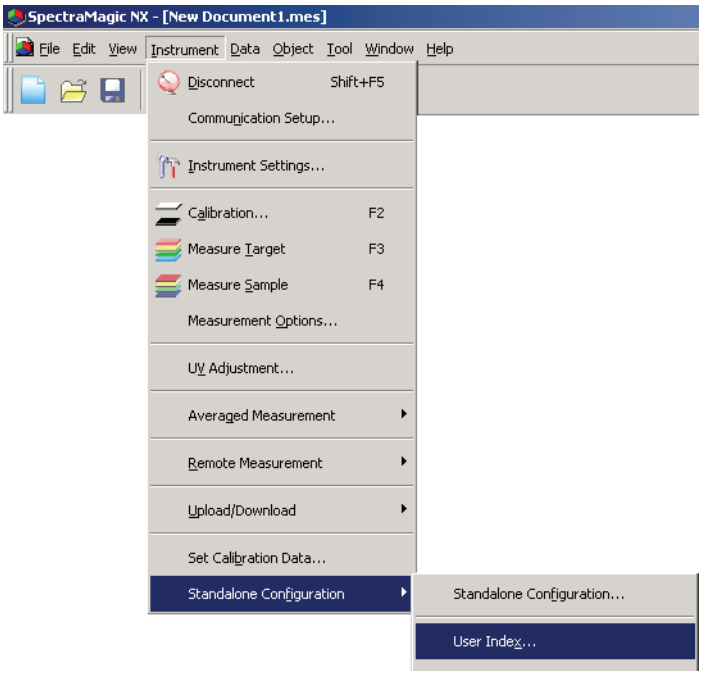
This procedure is available only when the CM-5 or CR-400/410 is connected and the protection key is attached to the computer.

You can use the SpectraMagic NX software to download an operational expression based on the color space to the instrument.

1. Select *Instrument* - *Standalone Configuration* - *User Index*.

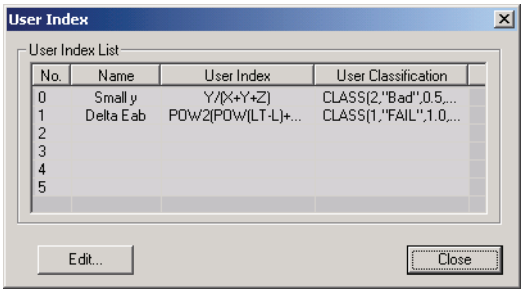
The User Index dialog box appears.

When the CM-5 is connected, select *Instrument* - *Standalone Configuration* from the menu bar. When the Standalone Configuration dialog box appears, select User Index. For details, see page 166.



2. Select the number (No.), and click the Edit button.

The User Index Setting dialog appears.

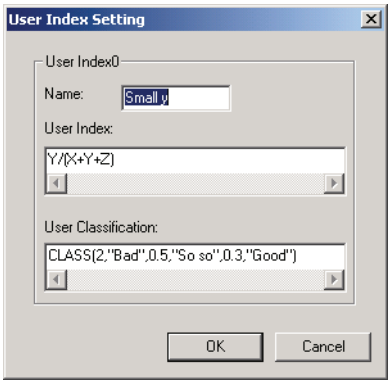


(Sample display when the CR-400/410 is connected)

3. Input the User Index Name, the User Index, and the User Classification.

Extended ASCII characters used as User Index Name may not be displayed correctly depending on the language setting of the instrument.

If you change a User Index setting and load it into the instrument, previously loaded User Classification definition for corresponding User Index channel inside the instrument will be cleared. Even if you do not need to change the User Classification definition, if the User Index setting is changed, the User Classification must be input again.



4. When the OK button is clicked, some dialogs for confirmation appear and the user index is downloaded to the instrument.

2.10.20 Downloading the Target Data to the Instrument

This procedure is available only when the spectrophotometer excluding the CM-3000 Series, or the chroma meter is connected and the protection key is attached to the computer.

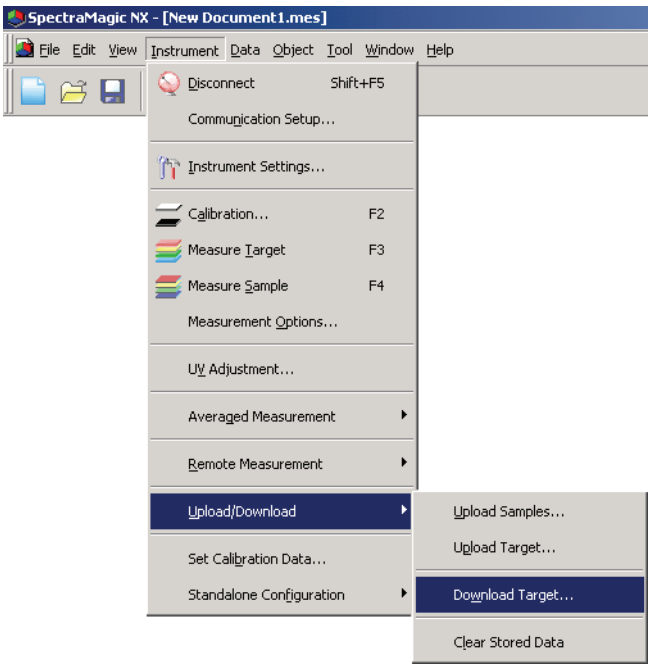
This operation is disabled when the number of banks is 2 (UV100 + UV0 or Opacity) or 3 (UV100 + UV0 + UVadj), or SCI + SCI (bank 2) on the CM-5.

When using the CM-2600d/2500d or CM-5/CR-5, perform this procedure after turning off the instrument's data protection function.

1. In the list window, open a data group by selecting All Data - Target(s), select one piece of data and select *Instrument* - *Upload/Download* - *Download Target* from the menu bar.

Or, right-click the target data and select *Download Target* from the displayed context menu.

The Target Download dialog box appears. You can select multiple targets and download them in succession. If the CM-5/CR-5 or CR-400/410 is connected, only target data consisting of a single bank of data can be downloaded.



2. Specify the details of the target data downloaded to the instrument.

For the procedure for the individual models, refer to pages 177 to 182.

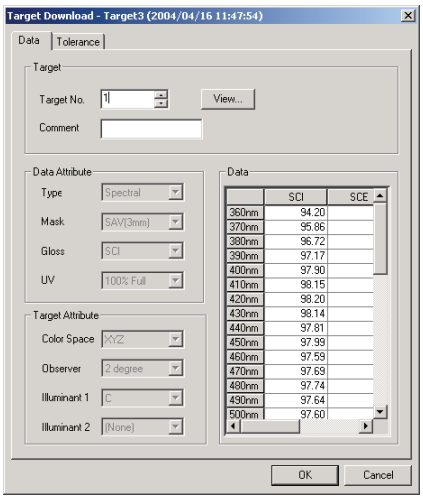
3. Click the OK button to start downloading data to the instrument.

When the CR-5 or CR-400/410 is connected and the target data selected in step 1 is spectral data, the data will be converted to colorimetric data and then downloaded to the instrument.

The target data cannot be downloaded when the number of data banks is different from the setting in the instrument.

■ Target Download dialog box (when the CM-2600d/2500d or CM-2500c is connected)

Data tab



Target

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 the View button to see the details of the target with the specified number stored in the instrument.

Data Attribute

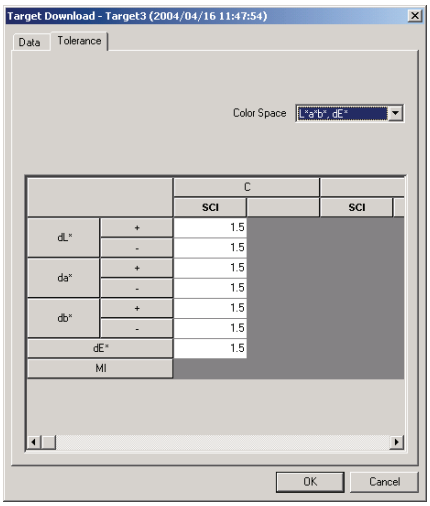
Type, Mask, Gloss and UV are displayed when the CM-2600d/2500d is connected. Type and Mask are displayed when the CM-2500c is connected. If the selected data is manually input spectral data or manually input colorimetric data, specify the settings for Mask and Gloss.

Target Attribute

These parameters cannot be edited.

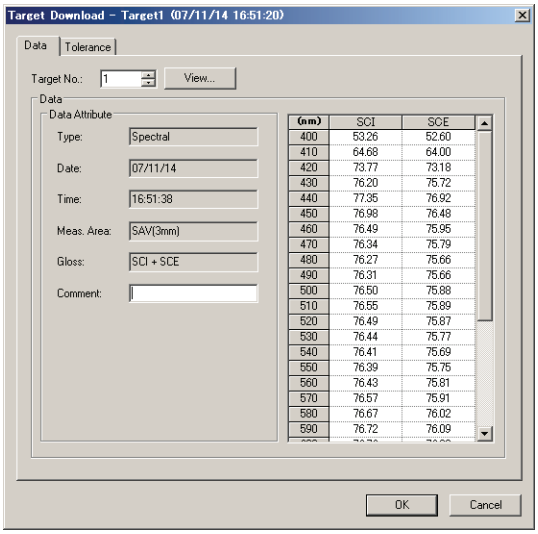
Tolerance tab

The tolerances specified for the selected target data are displayed.



■ Target Download dialog box (when the CM-700d/600d is connected)

Data tab



Target

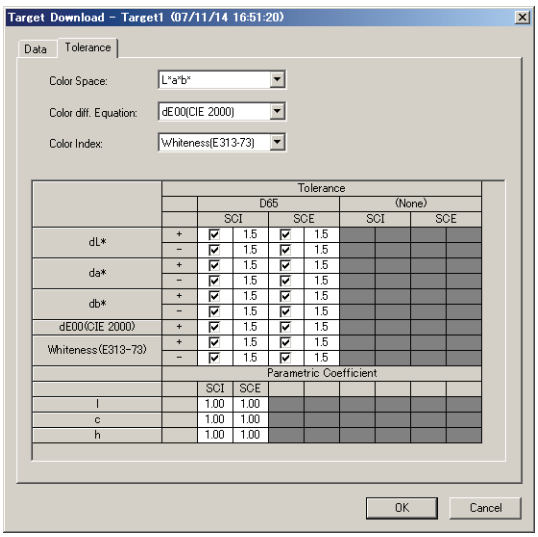
Specify the target number in the instrument to which the data is to be downloaded. The number displayed when you open the dialog box is the smallest unregistered target number stored in the instrument. Click the View button to see the details of the target with the specified number stored in the instrument.

Data Attribute

Type, date, time, measurement area, specular component mode and comment are displayed. The parameters other than comment cannot be edited.

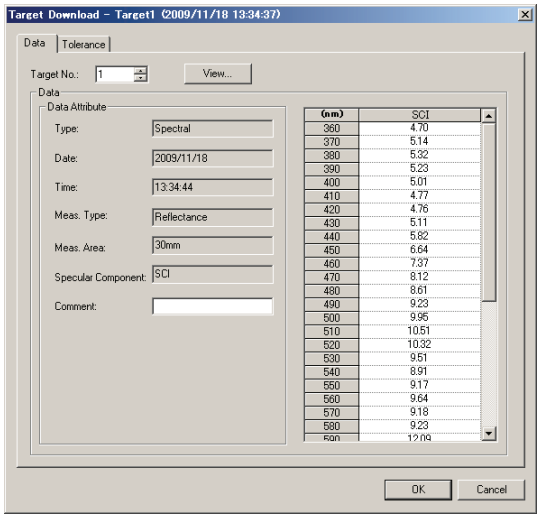
Tolerance tab

Enter tolerances for the selected target data.

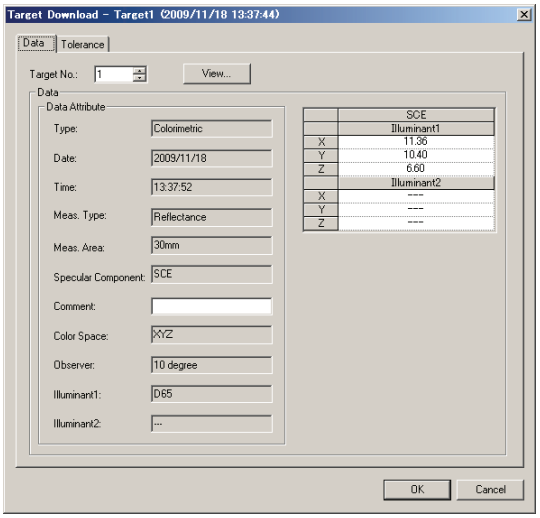


■ Target Download dialog box (when the CM-5/CR-5 is connected)

Data tab



(Sample display when the target data is Spectral)



(Sample display when the target data is Colorimetric)

Target

Specify the target number in the instrument to which the data is to be downloaded. The number displayed when you open this dialog box is the lowest target number in the instrument for which no data has been registered. Click the View button to see the details of the target with the specified number stored in the instrument.

Data Attribute

Type, Date, Time, Measurement Area, Specular Component and Comment are displayed.

The items other than Comment cannot be edited. The comment cannot contain characters other than those that can be set on the instrument. Please refer to “Editing Target Color Data: Edit Name” in the instrument instruction manual.

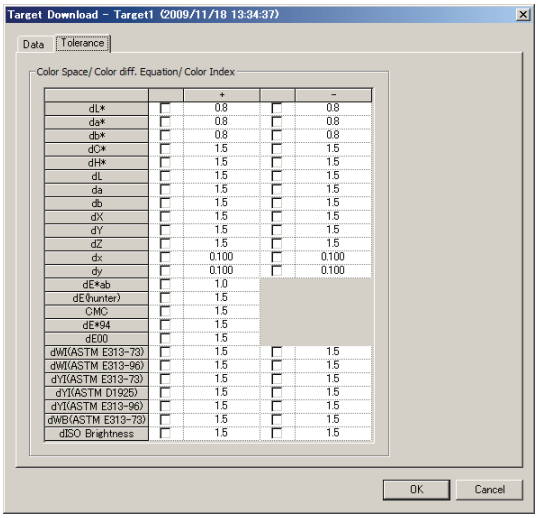
Ⓜ Spectral is only displayed for the CM-5.

Tolerance tab

Enter the tolerances you want to set for the selected target data.

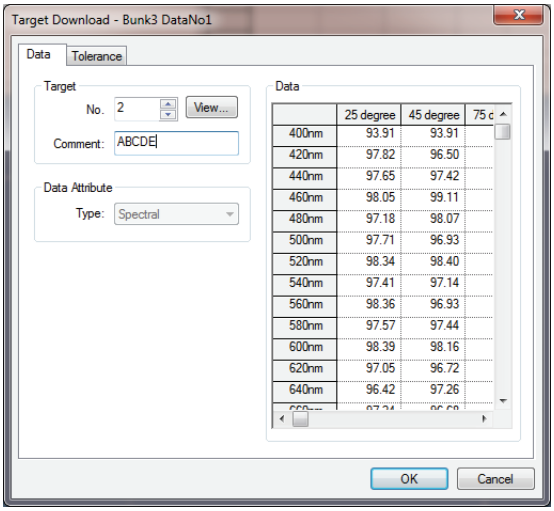
The default values are set by the SpectraMagic NX software.

Ⓜ The tolerance for ISO Brightness can be set with the CM-5 only.



■ Target Download dialog box (when the CM-512m3A/512m3 is connected)

Data tab



Target

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 smallest unregistered target number stored in the instrument. Click the View button to see the details of the target with the specified number stored in the instrument.

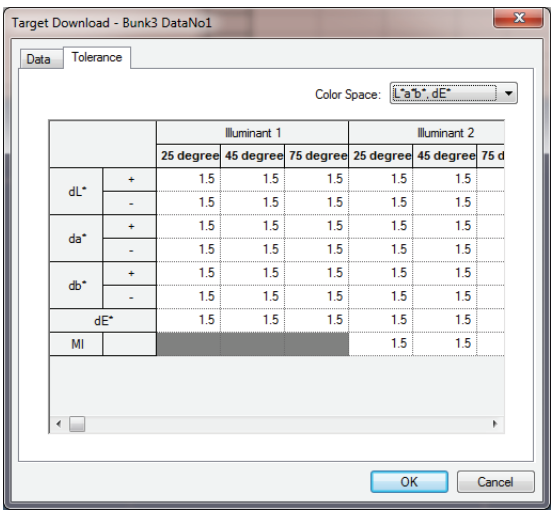
Data Attribute

Type: Spectral (Cannot be changed.)

- It is not possible to download colorimetric target data to the instrument.

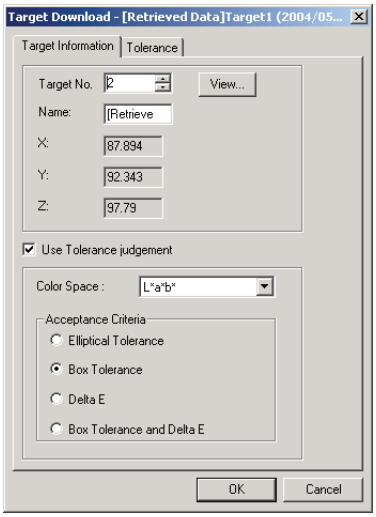
Tolerance tab

Enter tolerances for the selected target data.



■ Target Download dialog box (when the CR-400/410 is connected)

Target Information tab



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 the View button to see the details of the target with the specified number stored in the instrument.

Use Tolerance judgement

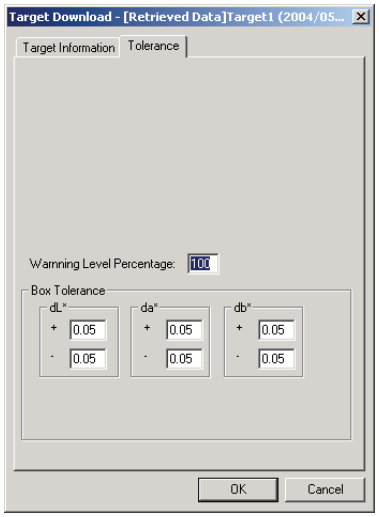
When checked, tolerance values can be stored with the target.

Acceptance Criteria

Select “Elliptical Tolerance”, “Box Tolerance”, “Delta E” or “Box Tolerance and Delta E”.

Tolerance tab

The tolerances specified for the selected target data are displayed.



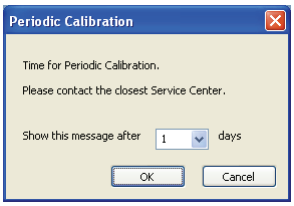
2.10.21 Annual Service Recalibration Recommendation Message

* This procedure is available only when the CM-3700A/CM-3700A-U, CM-3600A, CM-512m3A, CM-5/CR-5, or CM-700d/CM-600d is connected and the protection key is attached to the computer.

Annual service recalibration date is registered on the instrument at the factory or at the timing of calibration service (or maintenance service).

On the CM-512m3A, CM-5/CR-5, or CM-700d/CM-600d, a message recommending service calibration is displayed on the LCD screen at power-on approximately one year following the registered annual service recalibration date, provided the annual service recalibration recommendation message display is set to “ON” on the instrument.

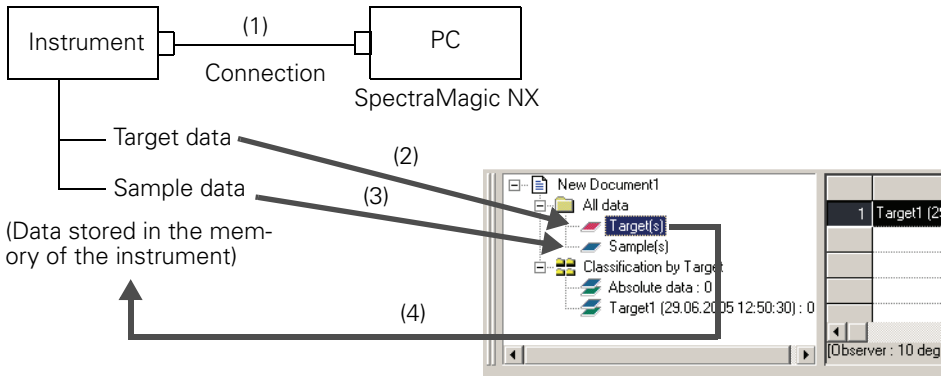
On SpectraMagic NX, a dialog box recommending annual service recalibration is displayed at connection approximately one year following the initial connection of the instrument and SpectraMagic NX. (On the CM-512m3A, CM-5/CR-5, or CM-700d/CM-600d, this dialog box will be displayed only if the annual service recalibration recommendation message display is set to “ON” on the instrument.) With the CM-3700A/CM-3700A-U, CM-3600A/CM-3610A, and CM-512m3A, you can set the date interval (1, 3, 7, 30, 180, or 365 days) to display this dialog box.



2.10.22 Sensor Sync Function

This procedure is available only when the spectraphotometer excluding the CM-3000 Series or the chroma meter is connected and the protection key is attached to the computer.

This window shows the data structure (the relationship between target data and sample data), in the instrument connected to SpectraMagic NX software.
Since the data is displayed in a tree structure, it is easy to select only necessary data and upload it in the document file or download it to the instrument.



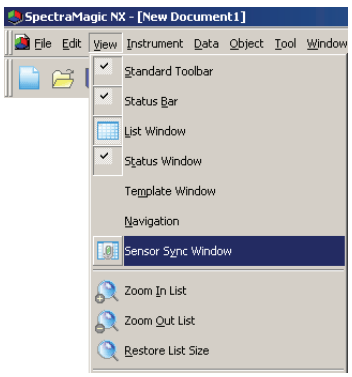
Displaying the sensor sync window

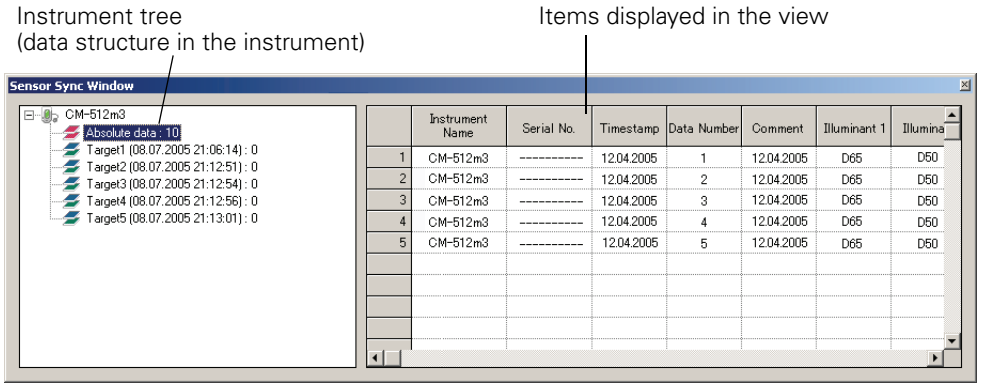
1. Connect the instrument.

If the instrument is already connected to the PC, the PC acquires the data stored in the instrument at the time you select to show the sensor sync window from hidden status. Or, the PC acquires the data when you connect the instrument to the PC with the sensor sync window being displayed. Consequently, you do not have to connect the instrument from the beginning.

2. Select *View* - *Sensor Sync Window* from the menu bar.

The sensor sync window is displayed.





Note:

- The sensor sync window is always displayed at the front and can be operated as an independent window. It can also be docked with the list window or status window.
- If the instrument is disconnected while the sensor sync window is displayed, the data shown in the sensor sync window disappears.
- While data is being acquired to the PC, a message window appears and indicates the progress. Do not disconnect the instrument during this period.

■ Items displayed in the view

Instrument name	Name of the instrument	
Serial No.	Unit number	
Timestamp	Date and time of the measurement	When the CM-2600d/2500d or CM-2500c is connected, the date and time are displayed in the order of YYYY/MM/DD or DD/MM/YYYY according to the display language setting and ROM version of the instrument.
Data Number	Data name (data number assigned in the instrument)	
Comment	Comment	
Observer	Observer	The items displayed here are not the setting in the instrument but the setting for SpectraMagic NX. Make sure that the settings are the same between the instrument and SpectraMagic NX.
Illuminant 1	Primary illuminant	
Illuminant 2	Secondary illuminant	

■ Information to be acquired but not displayed in the view

- Spectral reflectance data
  When the CR-5 or CR-400/410 is connected, the colorimetric data is acquired.
- Tolerance value when the target data is acquired (only when the CM-512m3 with ROM version 3.05 or later is connected)

Uploading target data

■ Using the drag & drop operation

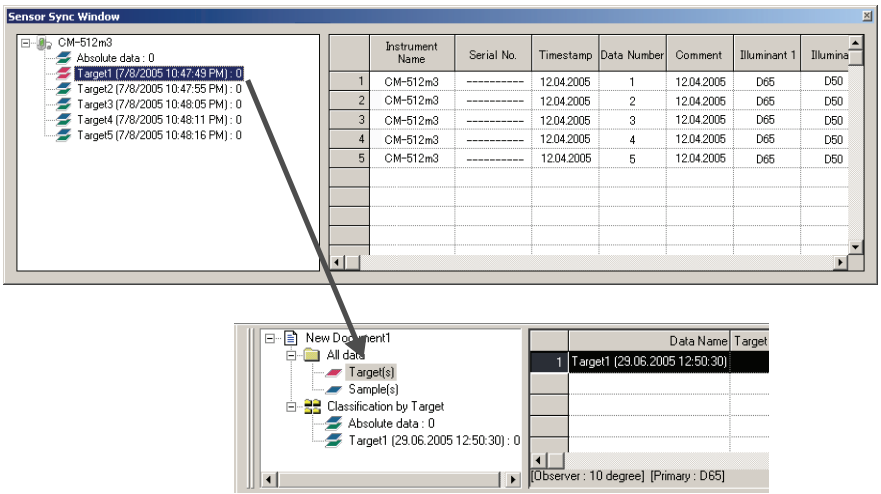
1. Select the target data to upload from the instrument tree in the sensor sync window.

   Note: Only one piece of data can be selected.

2. Drag and drop the target data into the Target(s) data group under All data in the list window.

   Note:

   - The data cannot be dropped into locations other than the Target(s) data group.
   - If target data with the same name already exists in the document file, a confirmation dialog box appears.



■ Using the right-click menu

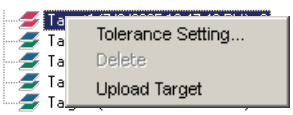
1. Select the target data to upload from the instrument tree in the sensor sync window.

   Note: Only one piece of data can be selected.

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

3. Select Upload Target.

   Note: If target data with the same name already exists in the document file, a confirmation dialog box appears.



■ The dialog box that appears when target data with the same name exists in the document file

When Yes is selected:

A new Target* data group is created under Classification by Target in the list window. All of the sample data linked to this target data is uploaded.

Note: The name of the uploaded data is assigned automatically.

When No is selected:

The sample data linked to the selected target data is added to the existing Target* data group with the same name under Classification by Target in the list window.

Note:

- If the same data already exists, the data is not uploaded.
- Whether the data is the same or not is determined by their properties, which are the date and time of the measurement, the name of the target data being linked, and the spectral reflectance data or colorimetric data.

Uploading sample data

■ Using the drag & drop operation

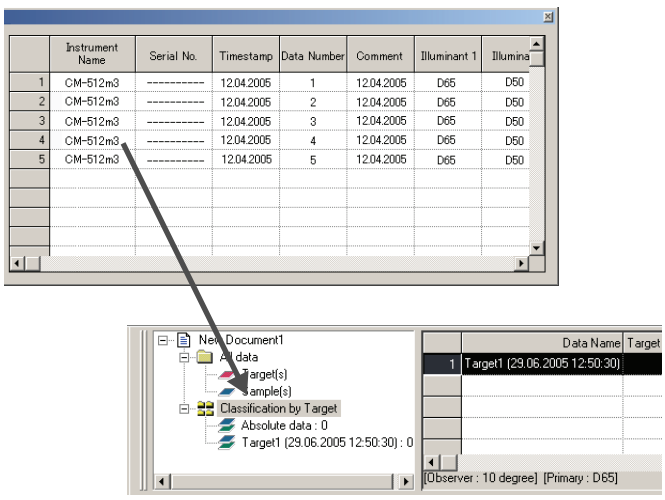
1. Select the sample data to upload from the view in the sensor sync window.

   Note: One or more pieces of data can be selected.

2. Drag and drop the data into any of the data groups under Classification by Target in the list window.

   Note:

   - The data cannot be dropped into other locations.
   - The data is added as the sample data linked to the target data in the data group where it is dropped.
   - When several pieces of data are selected, all of the pieces are linked to the same target data.
   - If sample data with the same name already exists, a confirmation dialog box appears.
   - The name of the data is assigned automatically.



■ Using the right-click menu

1. Select the sample data to load from the view in the sensor sync window.
   Note: One or more pieces of data can be selected.
2. Right-click the data and open the right-click menu.
3. Select Upload Samples data.
   The Target linkage dialog box appears.

■ The dialog box that appears when the same sample data exists in the document file

When Yes is selected:

The data is added as new sample data linked to the target data.

Note: The name of the loaded sample data is assigned automatically.

When No is selected:

The data is added as sample data linked to the target data.

Note:

- If the same data already exists, the data is not uploaded.
- Whether the data is the same or not is determined by their properties, which are the date and time of the measurement, the name of the target data being linked, and the spectral reflectance data or colorimetric data.

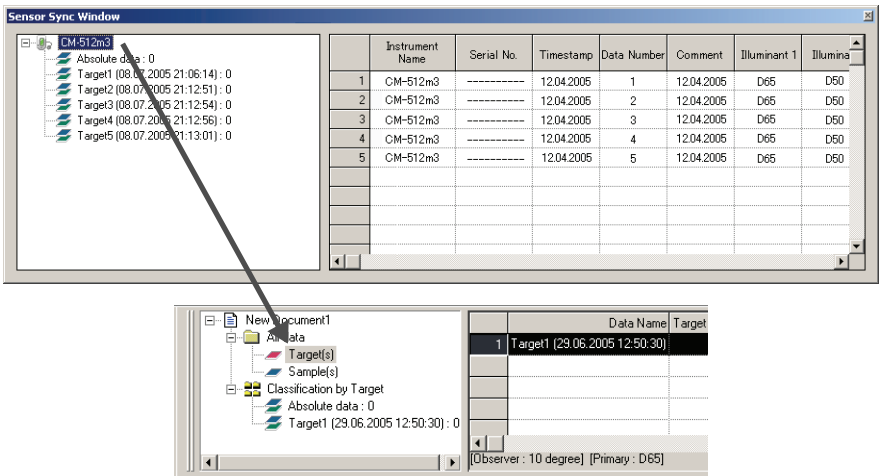
Uploading all data

■ Using the drag & drop operation

1. Select the instrument name icon to upload from the instrument tree in the sensor sync window.
2. Drag and drop the instrument name icon into the Target(s) data group under All data in the list window.

Note:

- The data cannot be dropped into locations other than the Target(s) data group.
- If target data with the same name already exists in the document file, a confirmation dialog box appears.



Downloading target data from the document file to the instrument

- Data cannot be download to the instrument in the following cases:
  - When the number of banks is different
  - When the observer and illuminant are different (in the cases of manually-input colorimetric data, CR-5 data or CR-400 data)
- When the CM-512m3A or the CM-512m3 with ROM version 3.05 or later is connected, the tolerance value specified for the target data is applied to the downloaded data.
- All the data is download to the instrument as target data.

■ Using the drag & drop operation

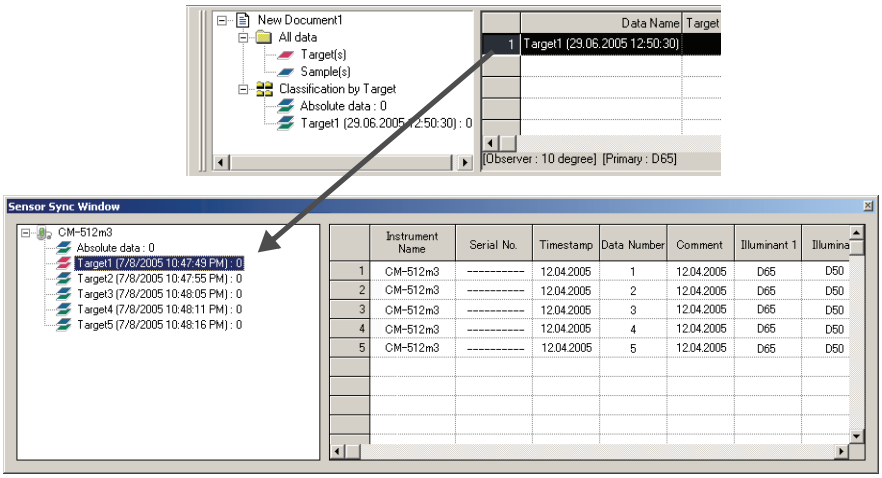
1. Select the target data to download to the instrument from the list window.

   Note: One or more pieces of data can be selected as long as the data is selected from All data - Target(s) data group.

2. Drag and drop the data into the instrument tree in the sensor sync window.

   A dialog box appears and the target data is added to the instrument.

   Note: When the CM-5/CR-5 is connected, the instrument tree in the sensor sync window is displayed in a closed state. Select the tree to display the tree again.



■ Using the right-click menu

1. Select the target data to write into the instrument from the list window.

   Note: One or more pieces of data can be selected as long as the data is selected from All data - Target(s) data group.

2. Right-click the target data and open the right-click menu.
3. Select Download Target.

   Alternatively, select data from All data - Target(s) data group, open the right-click menu, and select Download Target.

   A dialog box appears and the target data is added to the instrument.

   The downloaded data is added as the last data in the instrument. When the CR-400 is connected, however, you can specify the location for downloading data.

Note: When the CM-5/CR-5 is connected, the instrument tree in the sensor sync window is displayed in a closed state. Select the tree to display the tree again.

Deleting data stored in the instrument

This function is available only when the connected instrument is any of the following:

- CM-512m3A
- CM-512m3 with ROM version 3.05 or later

1. To delete target data, select it from the instrument tree in the sensor sync window. (Only one piece of data can be selected.)

   To delete sample data, select it from the view in the sensor sync window. (One or more data pieces can be selected.)

2. Right-click the data and select Delete from the right-click menu.

   The Delete key can also be used instead of the Delete menu item.

3. A confirmation dialog box appears showing a message “Are you sure to delete selected data?”.

   Click the OK button to delete the data.

   Click the Cancel button to cancel the deletion.

Tolerance setting

The tolerance setting function is available when any of the following instruments are connected:

- CM-512m3A or CM-512m3
- CM-5/CR-5
- CR-400/410

Select the target data from the instrument tree in the sensor sync window, open the right-click menu, and select Tolerance Setting. The Tolerance Settings dialog box appears.

2.10.23 Macro Operation Ⓟ

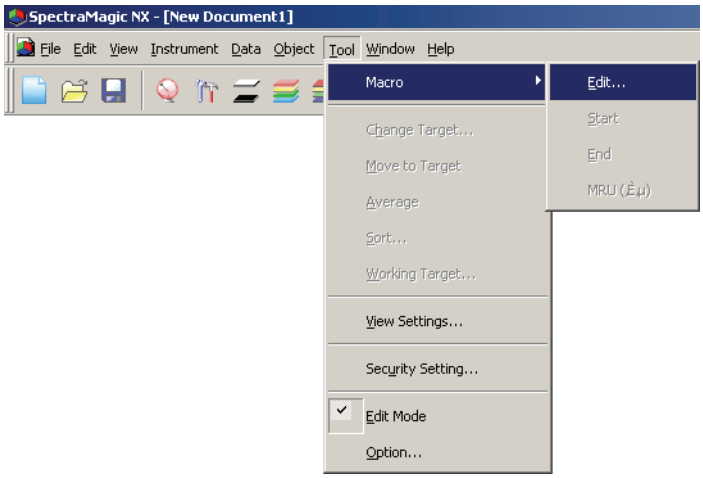
This function is supported by the SpectraMagic NX Professional Edition only.

You can automate various operations of SpectraMagic NX. Define each operation as a macro and execute the defined macro.

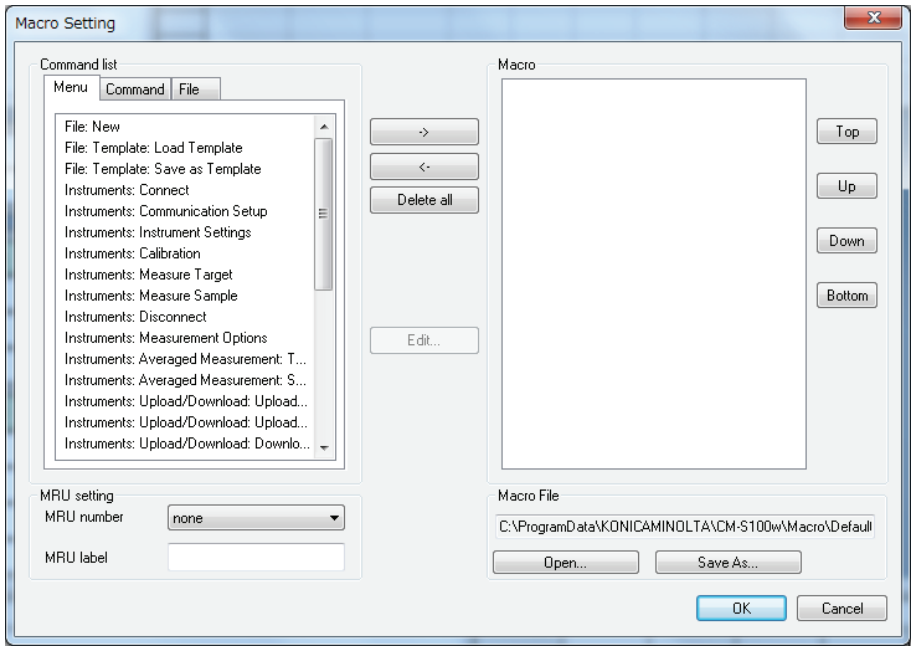
When the CM-700d/600d is connected, you can use a macro to display an user-defined message on the LCD screen of the instrument.

Defining a macro

1. Select *Tool* - *Macro* - *Edit* from the menu bar.



The Macro Setting dialog box appears.



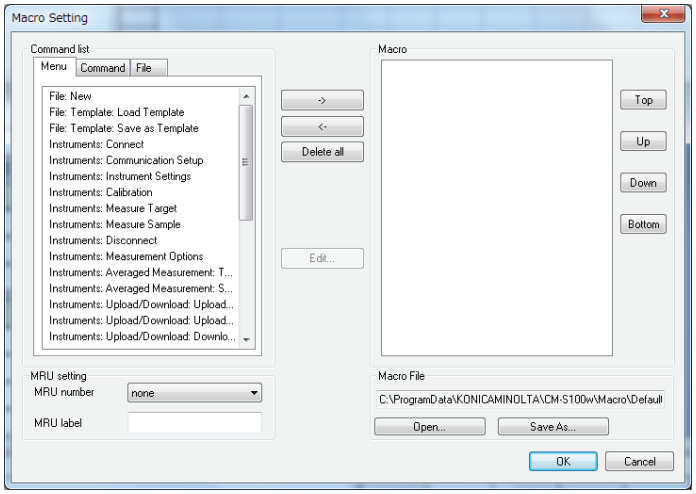
2. Define a macro.

■ Macro Setting dialog box

Command list - Menu tab

The menu of the SpectraMagic NX is displayed. Select a required menu and click the –> button. The selected menu is added to Macro on the right.
To delete a menu from Macro, select the menu from the list and click the <– button.

Command list - Command tab



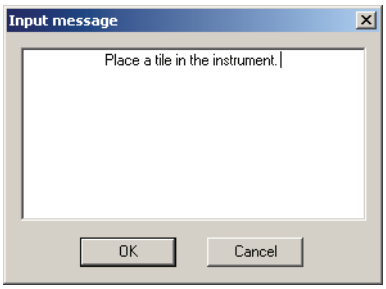
The following command menus are displayed. Select a required menu and click the –> button. A corresponding setting dialog box appears. When the setting finishes, the item is added to Macro on the right.
To delete an item from Macro, select it from the list and click the <– button.

Message

Specify a message to be displayed while the macro is executed.

Up to 256 alphanumeric characters can be entered.

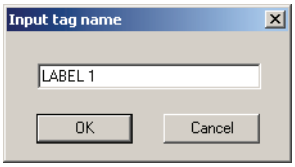
When a message is specified, it is displayed in a message box during macro execution. The message box has the OK button. When the OK button is clicked, the macro continues.



Tag

Specify a tag to a specific step in the macro.

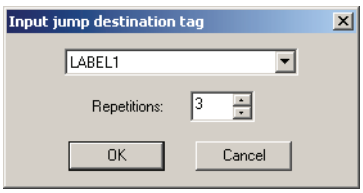
Up to 20 alphanumeric characters can be used.



Jump

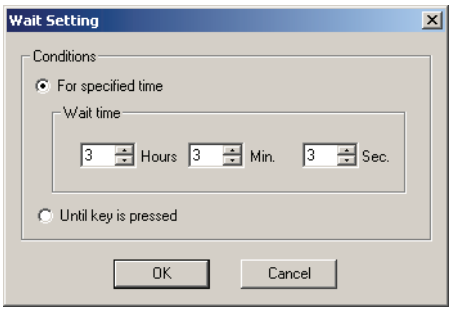
You can jump to the tag that is specified in advance.

You need to specify the number to repeat the jump to the tag. The number of repeats can be set between 1 and 9999.



Wait

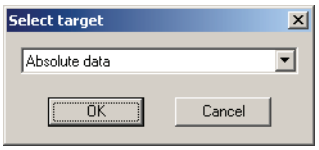
You can interrupt the macro execution for a certain period of time or until any key is pressed.



Target selection

Specify the target data used in the macro.

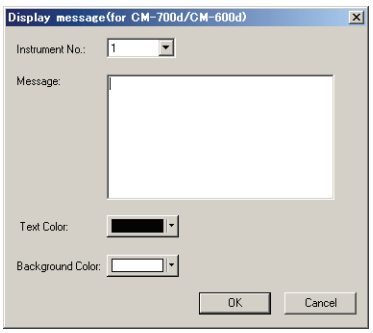
If the specified target data is not found during macro execution, an error occurs.



Display message (for CM-700d/CM-600d)

When the CM-700d/CM-600d is connected, specify the message and display color used for the LCD screen for each connected instrument individually, if necessary. (Up to four instruments may be connected at one time.)

The Message text box shows the sample LCD screen of the instrument. You can enter ASCII code characters within the range of 20 columns (20 alphanumeric characters) x 9 rows. For example if you want to display a line of characters at the middle of the LCD screen, enter the characters on the fifth row.



Command list - File tab

The menus related to file operation appear. Select a required menu and click the –> button, and the menu will be added to Macro on the right.
To delete a menu from Macro, select the menu from the list and click the <– button.

MRU settings

MRU number Select the MRU number (“1”, “2”, “3”, or “None”) to be assigned to the specified macro file, indicating the order in which it will appear in the Macro menu. If “None” is selected, the macro file will be saved but will not be shown in the menu.

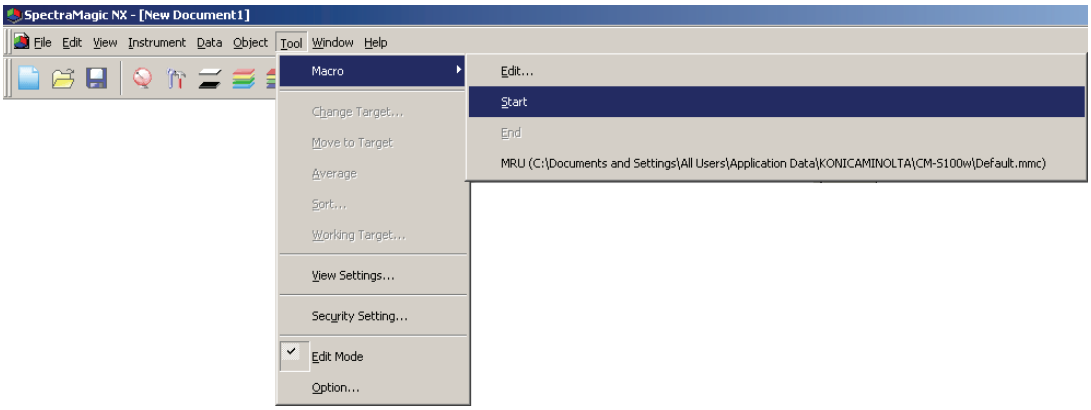
MRU label Set the label to be shown in the Macro menu for the specified macro file. The label can be up to 20 characters long.

Macro File

Open Select a saved macro file and open it.
Save As Save the specified macro as a macro file (Extension: mmc).

Executing a macro

1. Select *Tool* - *Macro* from the menu bar and select Start or one of the 3 *MRU*s.



Selecting *Start* will start the most recently opened macro file

Selecting one of the three MRUs will start the corresponding macro file as defined in the Macro Setting dialog.

The actions defined in Macro in the Macro Setting dialog box are executed sequentially from the top to the bottom.

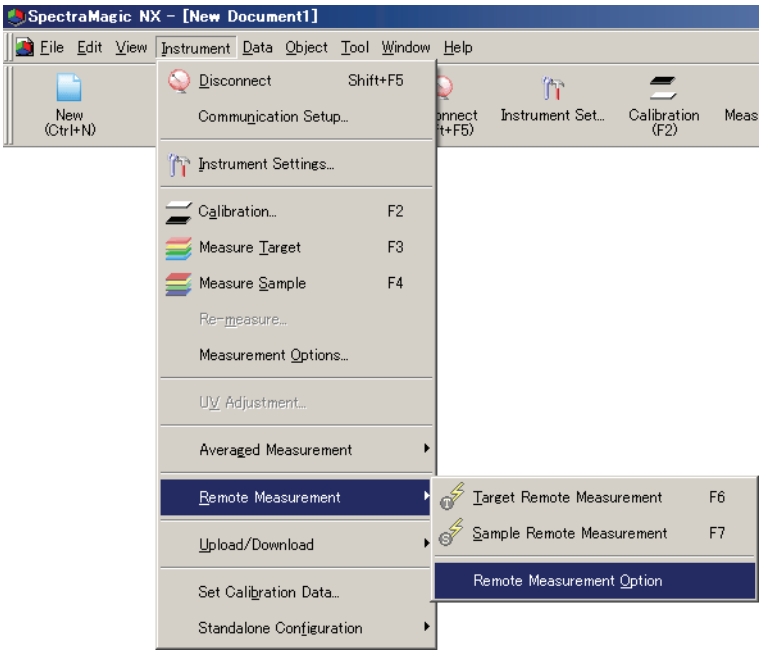
2.10.24 Setting the Display of the Instrument Screen for Remote Measurement

* This procedure is available only when the CM-700d/600d is connected.

When the CM-700d/600d is connected, the results of the measurement or pass/fail judgement for the "target remote measurement" and "sample remote measurement" can be displayed on the LCD screen of the instrument. You can check the measurement status on the LCD screen even when the instrument is operated remotely from the PC.

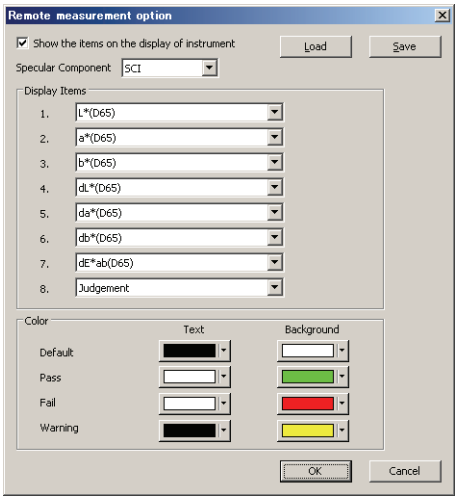
1. Select *Instrument* - *Remote Measurement* from the menu bar and select *Remote Measurement Option*.

The Remote Measurement Option dialog box appears.



2. Specify the following options for display items and colors.

■ Remote measurement option dialog box



Show the items on the display of instrument

When this box is checked, the items specified below are displayed on the instrument screen.

Specular Component

Since the CM-700d/600d can measure both SCI and SCE, specify the measurement mode to display the result. The results of both measurements cannot be displayed simultaneously.

Display Items

Specify the item(s) of the measured data to be displayed. You can specify up to 8 items from the list items specified in the procedure on page 46.

Note, however, that the following items cannot be specified: Lightness, Saturation, Hue, a* Evaluation, b* Evaluation, Pseudo Color, Pseudo Color (Target), Opacity (ISO 2471), Opacity Difference (ISO 2471), Opacity (TAPPI T425 89%), Opacity Difference (TAPPI T425 89%), Haze (ASTM D1003-97), and Haze Difference (ASTM D1003-97).

The table on the next page shows how the specified items are displayed on the LCD screen of the CM-700d/600d.

Color

Specify the colors of the characters and background to be displayed.
The items which are related to the pass/fail judgement are displayed with colors assigned at Pass, Fail, or Warning. The items that are not related to the pass/fail judgement are displayed with a color assigned as Default.

Save

Save the display item setting in a file.

Load

Load the display item setting that were stored in a saved file.

[Absolute Data]	Instrument display
XⓅ	X
YⓅ	Y
ZⓅ	Z
L*	L*
a*	a*
b*	b*
C*	C*
h	h
L99	L99
a99	a99
b99	b99
C99	C99
h99	h99
xⓅ	x
yⓅ	y
u*Ⓟ	u*
v*Ⓟ	v*
u'Ⓟ	u'
v'Ⓟ	v'
L (Hunter)	L
a (Hunter)	a
b (Hunter)	b

[Color Difference]	Instrument display
ΔXⓅ	dX
ΔYⓅ	dY
ΔZⓅ	dZ
ΔL*	dL*
Δa*	da*
Δb*	db*
ΔC*	dC*
ΔH*	dH*
ΔL99	dL99
Δa99	da99
Δb99	db99
ΔC99	dC99
ΔH99	dH99
ΔxⓅ	dx
ΔyⓅ	dy
Δu*Ⓟ	du*
Δv*Ⓟ	dv*
Δu'Ⓟ	du'
Δv'Ⓟ)	dv'
ΔL (Hunter)	dL
Δa (Hunter)	da
Δb (Hunter)	db

[Color Difference Equation]	Instrument display
ΔE*ab	dE*ab
CMC(l:c)Ⓟ	CMC(l:c)
ΔL-CMCⓅ	dL-CMC
ΔC-CMCⓅ	dC-CMC
ΔH-CMCⓅ	dH-CMC
ΔE*94(CIE 1994)Ⓟ<ΔE*94>	dE*94
ΔL-ΔE*94(CIE 1994)Ⓟ<ΔL-ΔE*94>	dL-dE*94
ΔC-ΔE*94(CIE 1994)Ⓟ<ΔC-ΔE*94>	dC-dE*94
ΔH-ΔE*94(CIE 1994)Ⓟ<ΔH-ΔE*94>	dH-dE*94
ΔE00(CIE 2000)<ΔE00>	dE00
ΔL'-ΔE00(CIE 2000)<ΔL'-ΔE00>	dL'-dE00
ΔC'-ΔE00(CIE 2000)<ΔC'-ΔE00>	dC'-dE00
ΔH'-ΔE00(CIE 2000)<ΔH'-ΔE00>	dH'-dE00
ΔEab(Hunter)	dEab
ΔE99	dE99
FMC2Ⓟ	FMC2
ΔL(FMC2)Ⓟ	dL(FMC2)
ΔCr-g(FMC2)Ⓟ	dCr-g
ΔCy-b(FMC2)Ⓟ	dCy-b
NBS100Ⓟ	NBS100
NBS200Ⓟ	NBS200
ΔEc(degree)(DIN 6175-2)Ⓟ	dEc(deg.)
ΔEp(degree)(DIN 6175-2)Ⓟ	dEp(deg.)

[Other]	Instrument display
MI	MI
Tristimulus StrengthⓅ	Strength
Tristimulus Strength XⓅ	Strength X
Tristimulus Strength YⓅ	Strength Y
Tristimulus Strength ZⓅ	Strength Z
Pseudo-tristimulus StrengthⓅ	Pseudo St.
Pseudo-tristimulus Strength XⓅ	Pseudo StX
Pseudo-tristimulus Strength YⓅ	Pseudo StY
Pseudo-tristimulus Strength ZⓅ	Pseudo StZ
Dominant WavelengthⓅ	Domi.Wave
Excitation PurityⓅ	Ex.Purity
555Ⓟ	555

[Index]	Instrument display
Munsell Hue (JIS Z8721 1964)<Munsell Hue>	H
Munsell Value (JIS Z8721 1964)<Munsell Value>	V
Munsell Chroma (JIS Z8721 1964)<Munsell Chroma>	C
WI(CIE 1982)Ⓟ<WI(CIE)>	WI(CIE)
WI(ASTM E313-73)Ⓟ<WI(E313-73)>	WI(-73)
WI(Hunter)Ⓟ	WI(Hunt.)
WI(TAUBE)Ⓟ	WI(TAUBE)
WI(STENSBY)Ⓟ	WI(ST.)
WI(BERGER)Ⓟ	WI(BERG.)
WI(ASTM E313-96)(C)Ⓟ<WI(E313-96)(C)>	WI(-96)
WI(ASTM E313-96)(D50)Ⓟ<WI(E313-96)(D50)>	
WI(ASTM E313-96)(D65)Ⓟ<WI(E313-96)(D65)>	
WI(Ganz)Ⓟ	WI(Ganz)
Tint(CIE)Ⓟ	Tint(CIE)
Tint(ASTM E313-96)(C)Ⓟ<Tint(E313-96)(C)>	Tint_ASTM
Tint(ASTM E313-96)(D50)Ⓟ<Tint(E313-96)(D50)>	
Tint(ASTM E313-96)(D65)Ⓟ<Tint(E313-96)(D65)>	
Tint(Ganz)Ⓟ	Tint(Ganz)
YI(ASTM D1925)Ⓟ<YI(D1925)>	YI(D1925)
YI(ASTM E313-73)Ⓟ<YI(E313-73)>	YI(-73)
YI(ASTM E313-96)(C)Ⓟ<YI(E313-96)(C)>	YI(-96)
YI(ASTM E313-96)(D65)Ⓟ<YI(E313-96)(D65)>	
YI(DIN 6167)(C)Ⓟ	YI(DIN)
YI(DIN 6167)(D65)Ⓟ	
WB(ASTM E313-73)Ⓟ<WB(E313-73)>	B(E313-73)
Brightness (TAPPI T452)Ⓟ<Brightness (TAPPI)>	Bright(T)
Brightness (ISO 2470)Ⓟ<Brightness (ISO)>	Bright(I)
Density B(ISO Status A)Ⓟ<Density B(A)>	StatusA_B
Density G(ISO Status A)Ⓟ<Density G(A)>	StatusA_G
Density R(ISO Status A)Ⓟ<Density R(A)>	StatusA_R
Density B(ISO Status T)Ⓟ<Density B(T)>	StatusT_B
Density G(ISO Status T)Ⓟ<Density G(T)>	StatusT_G
Density R(ISO Status T)Ⓟ<Density R(T)>	StatusT_R
Rx(C)Ⓟ	Rx
Rx(D65)Ⓟ	
Rx(A)Ⓟ	
Ry(C)Ⓟ	Ry
Ry(D65)Ⓟ	
Ry(A)Ⓟ	
Rz(C)Ⓟ	Rz
Rz(D65)Ⓟ	
Rz(A)Ⓟ	
Standard Depth (ISO 105.A06)Ⓟ<Standard Depth>	Std.Depth

< > Signifies abbreviated version used within this software.

Items marked with Ⓟ are supported only by SpectraMagic NX Professional Edition.

[Index Difference]	Instrument display
ΔWI(CIE 1982)Ⓟ<ΔWI(CIE)>	dWI(CIE)
ΔWI(ASTM E313-73)Ⓟ<ΔWI(E313-73)>	dWI(-73)
ΔWI(Hunter)Ⓟ	dWI(Hunt.)
ΔWI(TAUBE)Ⓟ	dWI(TAUBE)
ΔWI(STENSBY)Ⓟ	dWI(ST.)
ΔWI(BERGER)Ⓟ	dWI(BERG.)
ΔWI(ASTM E313-96)(C)Ⓟ<ΔWI(E313-96)(C)>	dWI(-96)
ΔWI(ASTM E313-96)(D50)Ⓟ<ΔWI(E313-96)(D50)>	
ΔWI(ASTM E313-96)(D65)Ⓟ<ΔWI(E313-96)(D65)>	
ΔWI(Ganz)Ⓟ	dWI(Ganz)
Tint diff. (CIE)Ⓟ	dTint(CIE)
Tint diff. (ASTM E313-96)(C)Ⓟ<Tint diff. (E313-96)(C)>	dTint_ASTM
Tint diff. (ASTM E313-96)(D50)Ⓟ<Tint diff. (E313-96)(D50)>	
Tint diff. (ASTM E313-96)(D65)Ⓟ<Tint diff. (E313-96)(D65)>	
Tint diff. (Ganz)Ⓟ	dTint(Ganz)
ΔYI(ASTM D1925)Ⓟ<ΔYI(D1925)>	dYI(D1925)
ΔYI(ASTM E313-73)Ⓟ<ΔYI(E313-73)>	dYI(-73)
ΔYI(ASTM E313-96(C)Ⓟ<ΔYI(E313-96)(C)>	dYI(-96)
ΔYI(ASTM E313-96)(D65)Ⓟ<ΔYI(E313-96)(D65)>	
ΔYI(DIN 6167(C)Ⓟ	dYI(DIN)
ΔYI(DIN 6167)(D65)Ⓟ	
ΔWB(ASTM E313-73)Ⓟ<ΔWB(E313-73)>	dB(E313-73)
Brightness diff. (TAPPI T452)Ⓟ<Brightness diff. (TAPPI)>	dBright(T)
Brightness diff. (ISO 2470)Ⓟ<Brightness diff. (ISO)>	dBright(I)
Density diff. B(ISO Status A)Ⓟ<Density diff. B(A)>	dStatusA_B
Density diff. G(ISO Status A)Ⓟ<Density diff. G(A)>	dStatusA_G
Density diff. R(ISO Status A)Ⓟ<Density diff. R(A)>	dStatusA_R
Density diff. B(ISO Status T)Ⓟ<Density diff. B(T)>	dStatusT_B
Density diff. G(ISO Status T)Ⓟ<Density diff. G(T)>	dStatusT_G
Density diff. R(ISO Status T)Ⓟ<Density diff. R(T)>	dStatusT_R
ΔRx(C)Ⓟ	dRx
ΔRx(D65)Ⓟ	
ΔRx(A)Ⓟ	
ΔRy(C)Ⓟ	dRy
ΔRy(D65)Ⓟ	
ΔRy(A)Ⓟ	
ΔRz(C)Ⓟ	dRz
ΔRz(D65)Ⓟ	
ΔRz(A)Ⓟ	
Std. Depth diff. (ISO 105.A06)Ⓟ<Std. Depth diff.>	dStd.Depth
Stain Test (ISO 105.A04E)(C)Ⓟ<Stain Test (C)>	Stain Test
Stain Test (ISO 105.A04E)(D65)Ⓟ<Stain Test (D65)>	
Stain Test Rating (ISO 105.A04E)(C)Ⓟ<Stain Test Rating (C)>	Stain TestR
Stain Test Rating (ISO 105.A04E)(D65)Ⓟ<Stain Test Rating (D65)>	
Grey Scale (ISO 105.A05)(C)Ⓟ<Grey Scale (C)>	GreyScale
Grey Scale (ISO 105.A05)(D65)Ⓟ<Grey Scale (D65)>	
Grey Scale Rating (ISO 105.A05)(C)Ⓟ<Grey Scale Rating (C)>	GreyScaleR
Grey Scale Rating (ISO 105.A05)(D65)Ⓟ<Grey Scale Rating (D65)>	
K/S Strength (Difference Comparison) (dE*)(C)Ⓟ<K/S Strength (dE*)(C)>	K/S St_dE*
K/S Strength (Difference Comparison) (ΔE*)(D65)Ⓟ<K/S Strength (ΔE*)(D65)>	
K/S Strength (Difference Comparison) (ΔL*)(C)Ⓟ<K/S Strength (ΔL*)(C)>	K/S St_dL*
K/S Strength (Difference Comparison) (ΔL*)(D65)Ⓟ<K/S Strength (ΔL*)(D65)>	
K/S Strength (Difference Comparison) (ΔC*)(C)Ⓟ<K/S Strength (ΔC*)(C)>	K/S St_dC*
K/S Strength (Difference Comparison) (ΔC*)(D65)Ⓟ<K/S Strength (ΔC*)(D65)>	
K/S Strength (Difference Comparison) (ΔH*)(C)Ⓟ<K/S Strength (ΔH*)(C)>	K/S St_dH*
K/S Strength (Difference Comparison) (ΔH*)(D65)Ⓟ<K/S Strength (ΔH*)(D65)>	
K/S Strength (Difference Comparison) (Δa*)(C)Ⓟ<K/S Strength (Δa*)(C)>	K/S St_da*
K/S Strength (Difference Comparison) (Δa*)(D65)Ⓟ<K/S Strength (Δa*)(D65)>	
K/S Strength (Difference Comparison) (Δb*)(C)Ⓟ<K/S Strength (Δb*)(C)>	K/S St_db*
K/S Strength (Difference Comparison) (Δb*)(D65)Ⓟ<K/S Strength (Δb*)(D65)>	
K/S Strength (All Wavelengths)Ⓟ<K/S Strength (Apparent)>	K/S_Ap.
K/S Strength (User Wavelength)Ⓟ<K/S Strength (User)>	K/S_U400
K/S Strength (Wavelength of maximum absorption)Ⓟ<K/S Strength (Max)>	K/S_MAX
Wavelength of K/S Strength (Wavelength of maximum absorption)Ⓟ	K/S_MAX nm
NC#(C)Ⓟ	NC#
NC#(D65)Ⓟ	
NC# Grade (C)Ⓟ	NC# Grade
NC# Grade (D65)Ⓟ	
Ns(C)Ⓟ	Ns
Ns(D65)Ⓟ	
Ns Grade (C)Ⓟ	Ns Grade
Ns Grade (D65)Ⓟ	

[Special]	Instrument display
8-degree glossⓅ	8gloss
User Equation 1Ⓟ	User Eq.1
User Equation 2Ⓟ	User Eq.2
User Equation 3Ⓟ	User Eq.3
User Equation 4Ⓟ	User Eq.4
User Equation 5Ⓟ	User Eq.5
User Equation 6Ⓟ	User Eq.6
User Equation 7Ⓟ	User Eq.7
User Equation 8Ⓟ	User Eq.8

< > Signifies abbreviated version used within this software.

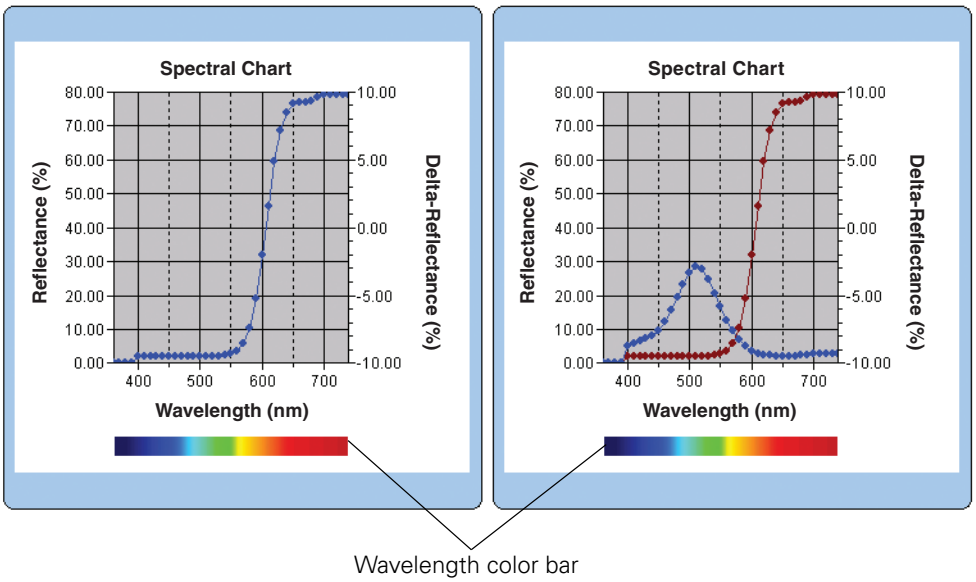
Items marked with Ⓟ are supported only by SpectraMagic NX Professional Edition.

Chapter 3
Graphic Object Properties

3.1 Spectral Graph Object

3.1.1 Overview

The spectral graph object is used to view spectral reflectance data. The horizontal axis of the graph represents the wavelength (nm) and the vertical axis represents the spectral reflectance (%).

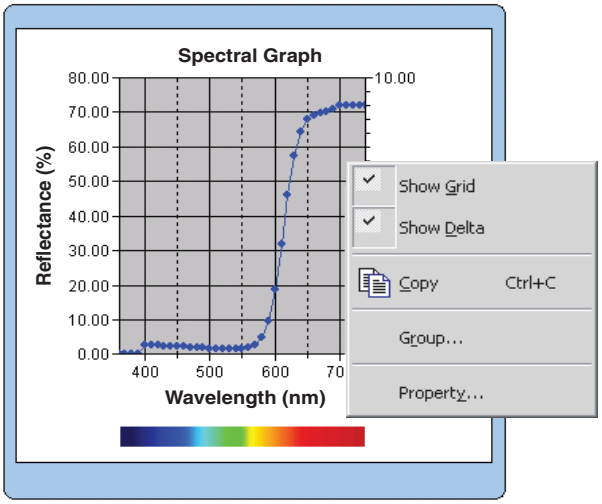


3.1.2 Features

- Plots a line graph of spectral reflectance.
- Indicates differences in reflectance (delta reflectance) of each wavelength.
- Displays a wavelength color bar.
- Graphs can be copied.
- Background, axis, and label colors are selectable.

3.1.3 Right-click Menu

Right-clicking a graphic object opens a context menu showing the available menu items. Table below shows the menu items available for the spectral graph object.



Right-click menu of spectral graph object

Menu Item	Function
Show Grid	Shows or hides the grid.
Show Delta	Shows differences between target data and sample data at each wavelength.
Copy	Copies the graphic object to the clipboard.
Group	Shows a dialog box for specifying the attributes of the data to be plotted.
Property	Shows the property dialog box for the graph.

See page 287 for the group attribute setting procedure.

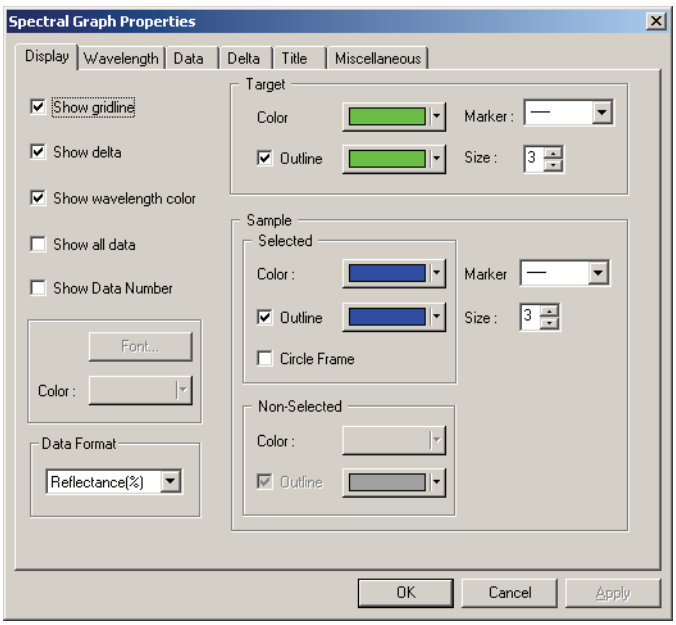
3.1.4 Setting Properties

Selecting Property from the right-click menu displays a dialog box for specifying the properties of the graph. The following six tabs are available for setting the properties of the spectral graph object.

1) Display
2) Wavelength
3) Data
4) Delta
5) Title
6) Miscellaneous

The following sections describe the details of these tabs.

1) Display tab



Show gridline

Select whether to show or hide gridlines.

Show delta

Select whether to show or hide the difference in reflectance between target data and sample data.
Note: When two or more pieces of sample data are selected, the results are overlapped on the graph.

Show wavelength color

Select whether to display the wavelength color bar below the wavelength axis.

Show all data

Select whether to show or hide all the data other than the selected data.

Show Data Number

Select whether to show or hide the data number shown on the list.
Font Specify the font of the number.
Color Specify the color of the number.

Data Format

Select the data format to display.
Selectable item: Reflectance (%), K/S, absorbance, Transparent (%)

Target - Color

Specify the display color of the target data.

Target - Outline

Specify the color of the outline of the plot points. When this option is not checked, the color of the outline cannot be specified.

Target - Marker

Specify -●-, -■-, X or — as the line type to indicate the target data.

Target - Size

Specify the size of the plot points of the target data (or the line width when — is selected as the line type).

Sample - Selected - Color

Specify the display color of the sample data being selected in the list window.

Sample - Selected - Outline

Specify the color of the outline of the plot points. When this option is not checked, the color of the outline cannot be specified.

Sample - Selected - Circle Frame

Draw a circle around the plot points of the selected data.

Sample - Non-Selected - Color

Specify the display color of the sample data that is not being selected in the list window.

Sample - Non-Selected - Outline

Specify the color of the outline of the plot points. When this option is not checked, the color of the outline cannot be specified.

Sample - Marker

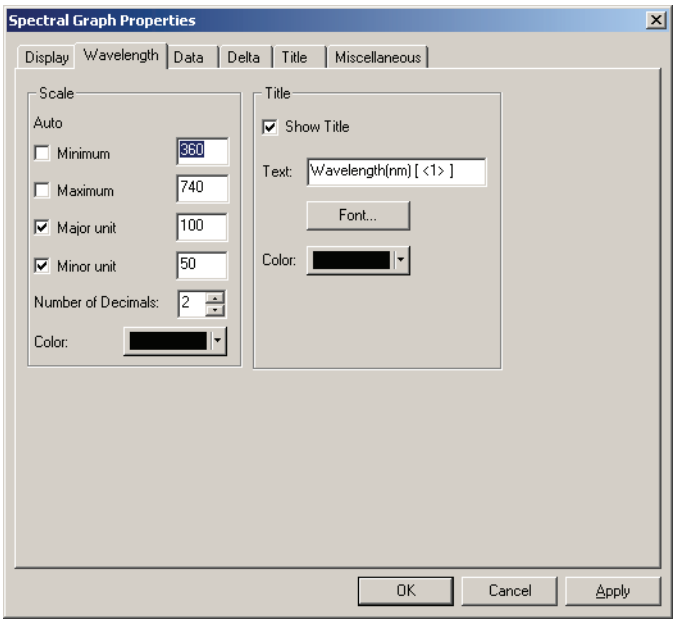
Specify -●-, -■-, X or — as the line type to indicate the sample data.

Sample - Size

Specify the size of the plot points of the sample data (or the line width when — is selected as the line type).

See page 154 for the color setting procedure.

2) Wavelength tab



Scale - Auto [Minimum, Maximum, Major unit, Minor unit]

Specify whether to use the automatic setting of the scale for the data axis (horizontal axis). When Auto is selected, these items are automatically determined according to the minimum and maximum values of the data.

Scale - Value [Minimum, Maximum, Major unit, Minor unit]

Specify the minimum value, maximum value, major unit and minor unit of the scale for the data axis.

Scale - Number of Decimals

Specify the number of decimal places to be displayed.

Scale - Color

Specify the scale color of the data axis.

Title - Show Title

Select whether to show or hide the title text of the wavelength axis.

Title - Text

Specify the label text appearing on the wavelength axis.

Title - Font

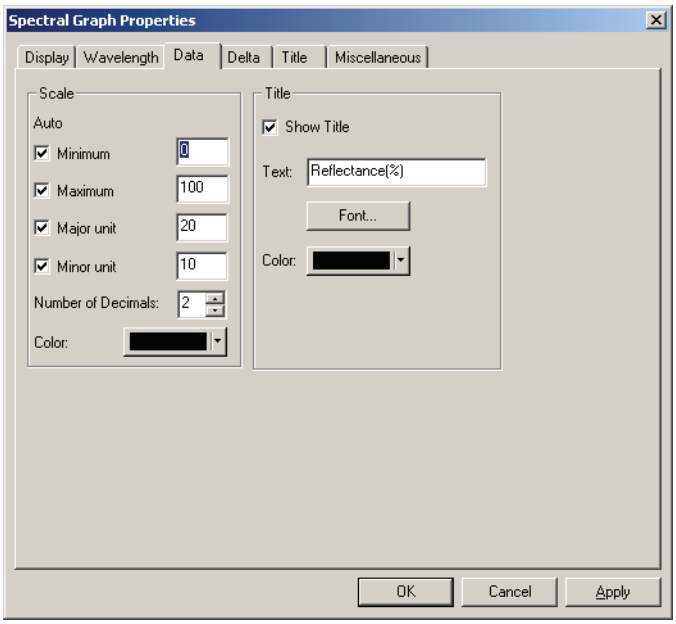
Specify the font to be used for the label appearing on the data axis. Be sure to also specify the language when specifying the font in the Font dialog box.

Title - Color

Specify a label color for the data axis.

See page 154 for the color setting procedure.

3) Data tab



Scale - Auto [Minimum, Maximum, Major unit, Minor unit]

Specify whether to use the automatic setting of the scale for the reflectance axis (horizontal axis). When Auto is selected, these items are automatically determined according to the minimum and maximum values of the data.

Scale - Value [Minimum, Maximum, Major unit, Minor unit]

Specify the minimum value, maximum value, major unit and minor unit of the scale for the reflectance axis.

Scale - Number of Decimals

Specify the number of decimal places to be displayed.

Scale - Color

Specify the scale color of the reflectance axis.

Title - Show Title

Select whether to show or hide the title text of the data axis.

Title - Text

Specify the label text appearing on the data axis.

Title - Font

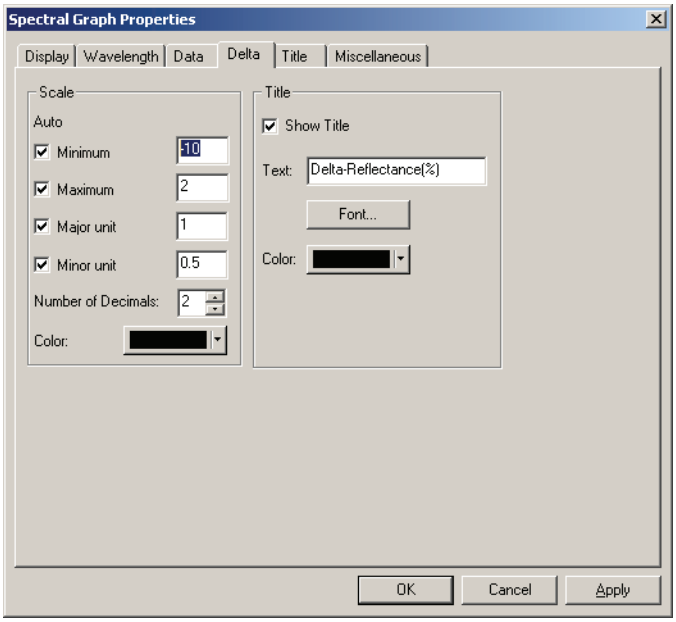
Specify the font to be used for the label appearing on the reflectance axis. Be sure to also specify the language when specifying the font in the Font dialog box.

Title - Color

Specify the label color for the reflectance axis.

See page 154 for the color setting procedure.

4) Delta tab



Scale - Auto [Minimum, Maximum, Major unit, Minor unit]

Specify whether to use the automatic setting of the scale for the delta-reflectance axis (vertical axis on the right). When Auto is selected, these items are automatically determined according to the minimum and maximum values of the data.

Scale - Value [Minimum, Maximum, Major unit, Minor unit]

Specify the minimum value, maximum value, major unit and minor unit of the scale for the delta-reflectance axis.

Scale - Number of Decimals

Specify the number of decimal places to be displayed.

Scale - Color

Specify the scale color of the delta-reflectance axis.

Title - Show Title

Select whether to show or hide the title text of the delta-reflectance axis.

Title - Text

Specify the label text appearing on the delta data axis.

Title - Font

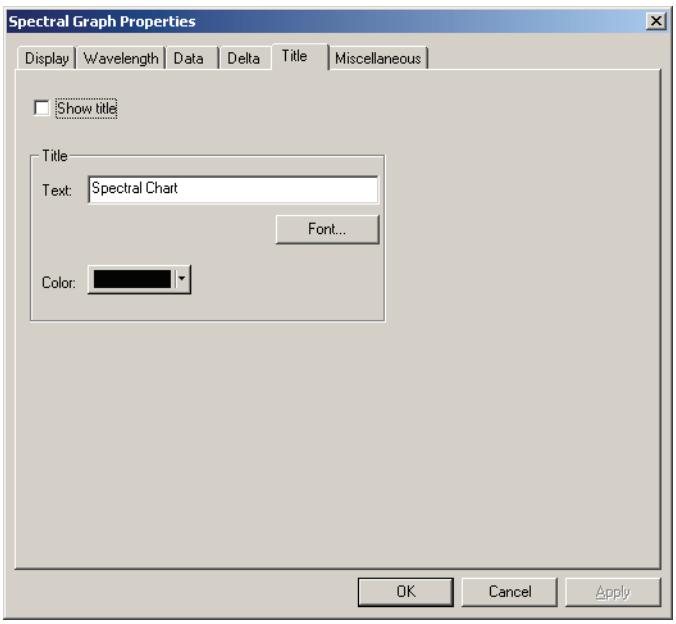
Specify the font to be used for the label appearing on the delta-reflectance axis. Be sure to also specify the language when specifying the font in the Font dialog box.

Title - Color

Specify the label color for the delta-reflectance axis.

See page 154 for the color setting procedure.

5) Title tab



Show title

Select whether to show or hide the title of the graph.

Title - Text

Specify the text for the graph title.

Title - Font

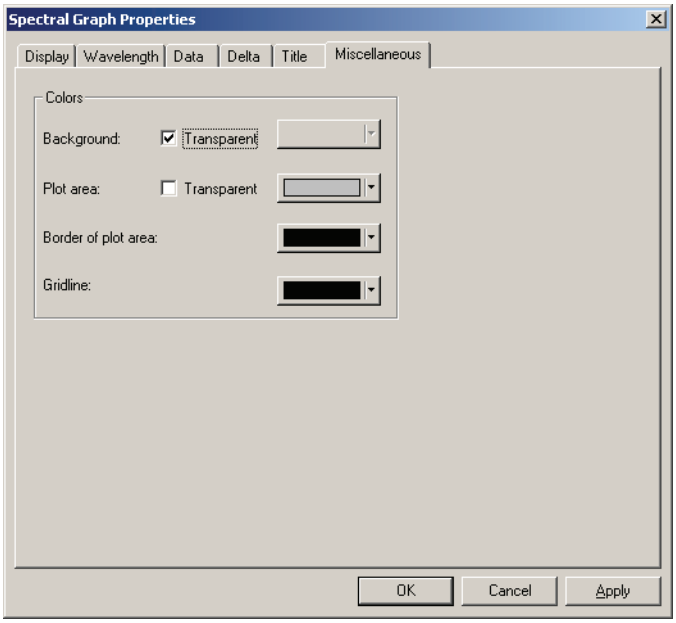
Specify the font to be used for the graph title. Be sure to also specify the language when specifying the font in the Font dialog box.

Title - Color

Specify the color of the graph title.

See page 154 for the color setting procedure.

6) Miscellaneous tab



Colors - Background

Specify the background color of the graphic object.

Transparent When this option is checked, the background is transparent.

Colors - Plot area

Specify the color to be used for the inside of the graph.

Transparent When this option is checked, the inside of the graph is transparent.

Colors - Border of plot area

Specify the border color of the graph.

Colors - Gridline

Specify the gridline color of the graph.

See page 154 for the color setting procedure.

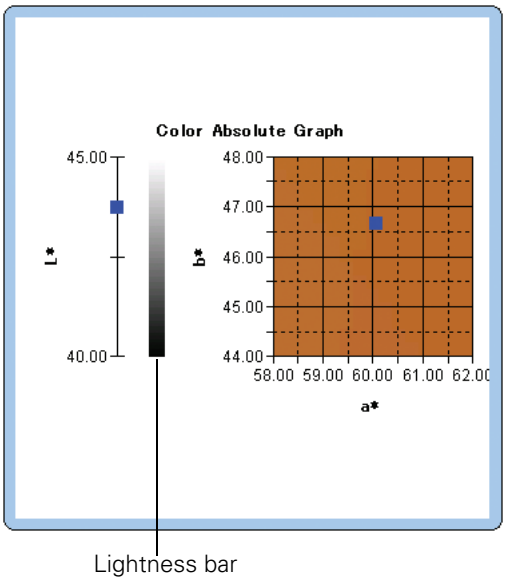
3.2 Absolute Graph (L*a*b, Hunter Lab) Object

3.2.1 Overview

The absolute graph object is used to view the absolute values under the L*a*b* or Hunter Lab color system. The L* or L value is plotted on the left side of the object, and the a*-b* or a-b value is plotted on the right side.

Depending on the plot type selected, the value of a*-b* or a-b, the value of a*-L* or a-L or the value of b*-L* or b-L is plotted.

If tolerance is set using the SpectraMagic NX software, measurement data plot points are displayed in the background color of the tolerance total judgement.

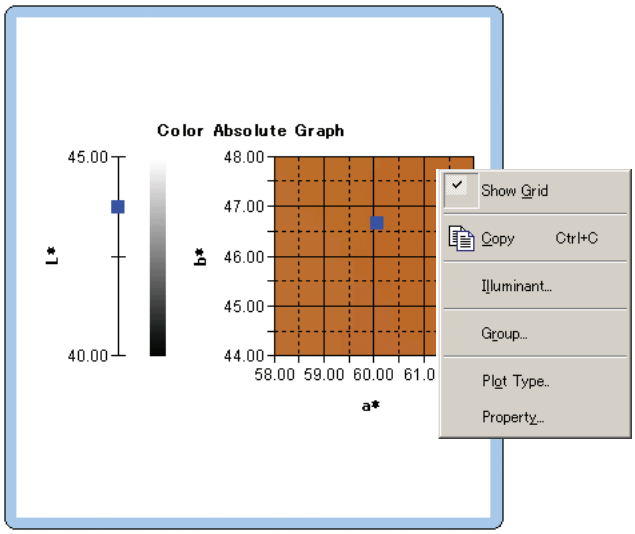


3.2.2 Features

- Plots an absolute graph for the L*a*b* or Hunter Lab color system.
- Shows the lightness bar.
- Shows the pseudo color of the a*-b* color space (for the L*a*b* color system only).
- Graphs can be copied.
- Background, axis, and label colors are selectable.

3.2.3 Right-click Menu

Right-clicking a graphic object opens a context menu showing the available menu items. Table below shows the menu items displayed for the absolute graph object.



Right-click menu of absolute graph object

Menu Item	Function
Show Grid	Shows or hides the grid.
Copy	Copies the graphic object to the clipboard.
Illuminant	Shows a dialog box for specifying the illuminant.
Group	Shows a dialog box for specifying the attributes of the data to be plotted.
Plot Type	Shows a dialog box for specifying a space to be drawn. Select one from “L*, a*-b*” (or “L, a-b”), “a*-b*” (or “a-b”), “a*-L*” (or “a-L”) or “b*-L*” (or “b-L”).
Property	Shows the property dialog box for the graph.

See page 286 for the illuminant setting procedure.

See page 287 for the group attribute setting procedure.

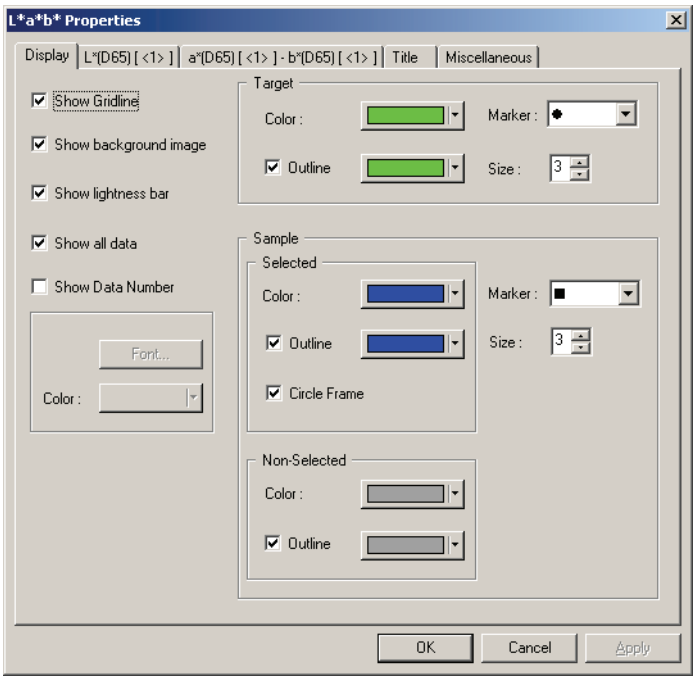
3.2.4 Setting Properties

Selecting Property from the right-click menu displays a dialog box for specifying the properties of the graph. The following five tabs are available for setting the properties of the absolute graph object.

1) Display
2) L* or L (For a plot type of “L*, a*-b*” (or “L, a-b”) only)
3) a*-b*, a-b, a*-L*, a-L, b*-L* or b-L
4) Title
5) Miscellaneous

The following sections describe the details of these tabs.

1) Display tab



Show Gridline

Select whether to show or hide gridlines.

Show background image (L*a*b* color system only)

Select whether to show or hide the pseudo color of the a*-b* color space.

Show lightness bar (For a plot type of "L*, a*-b*" (or "L, a-b") only)

Select whether to display the lightness bar for the L* or L axis.

Show all data

Select whether to show or hide all the data. If Show all data is not checked, the selected data is displayed.

Show Data Number

Select whether to show or hide the data number shown on the list.

Font Specify the font of the number.
Color Specify the color of the number.

Target - Color

Specify the display color of the target data.

Target - Outline

Specify the color of the outline of the plot points. When this option is not checked, the color of the outline cannot be specified.

Target - Marker

Specify ●, ■, X or + as the marker type for plotting the target data.

Target - Size

Specify the size of the plot points.

Sample - Selected - Color

Specify the display color of the sample data being selected in the list window.

Sample - Selected - Outline

Specify the color of the outline of the plot points. When this option is not checked, the color of the outline cannot be specified.

Sample - Selected - Circle Frame

Draw a circle around the plot points of the selected data.

Sample - Non-Selected - Color

Specify the display color of the sample data that is not being selected in the list window.

Sample - Non-Selected - Outline

Specify the color of the outline of the plot points. When this option is not checked, the color of the outline cannot be specified.

Sample - Marker

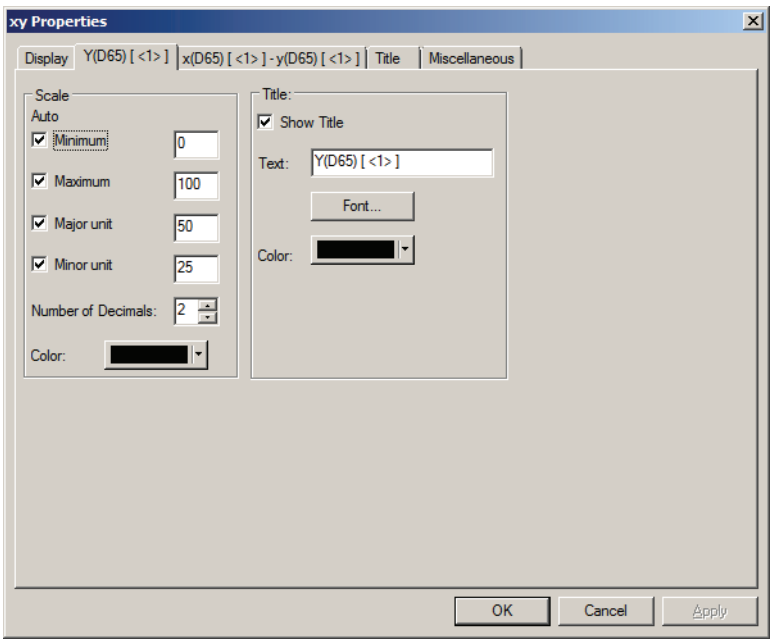
Specify ●, ■, X or + as the marker type to plot the sample data.

Sample - Size

Specify the size of the plot points.

See page 154 for the color setting procedure.

2) Lightness axis (L* or L) tab



Scale - Auto [Minimum, Maximum, Major unit, Minor unit]

Specify whether to use the automatic setting of the scale for the lightness axis. When Auto is selected, these items are automatically determined according to the minimum and maximum values of the data.

Scale - Value [Minimum, Maximum, Major unit, Minor unit]

Specify the minimum value, maximum value, major unit and minor unit of the scale for the lightness axis.

Scale - Number of Decimals

Specify the number of decimal places to be displayed.

Scale - Color

Specify the scale color of the lightness axis.

Title - Show Title

Select whether to show or hide the title text of the lightness axis.

Title - Text

Specify the label text appearing on the lightness axis.

Title - Font

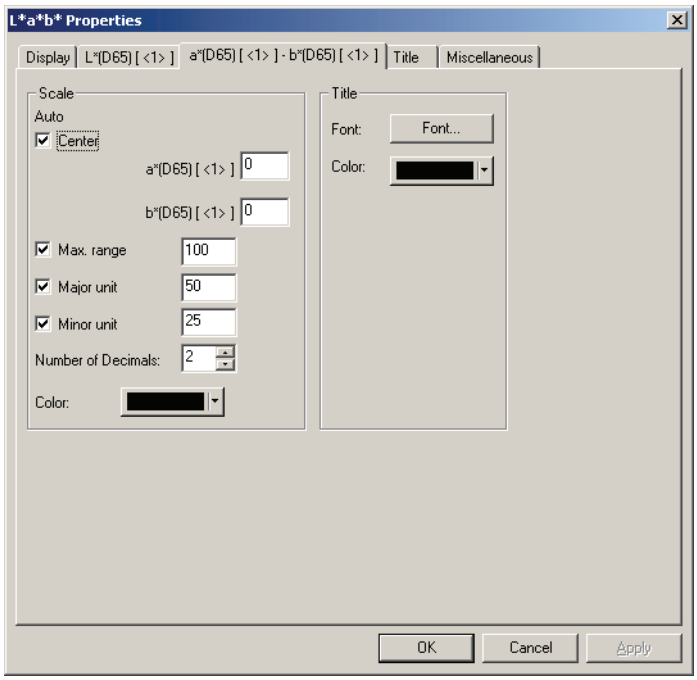
Specify the font to be used for the label appearing on the lightness axis. Be sure to also specify the language when specifying the font in the Font dialog box.

Title - Color

Specify the label color of the lightness axis.

See page 154 for the color setting procedure.

3) Chromaticity axis (a*-b*, a-b, a*-L*, a-L, b*-L* or b-L) tab



Scale - Auto [Center, Max. range, Major unit, Minor unit]

Specify whether to use the automatic setting of the scale. When Auto is selected, these items are automatically determined according to the minimum and maximum values of the data.

Scale - Center

Specify the coordinates of the center of the display area in the color space.

Scale - Max. range

Specify the distance (maximum range) from the center in order to limit the display area.

Scale - Value [Major unit, Minor unit]

Specify the major and minor units of the scale.

Scale - Number of Decimals

Specify the number of decimal places to be displayed.

Scale - Color

Specify the scale color.

Title - Font

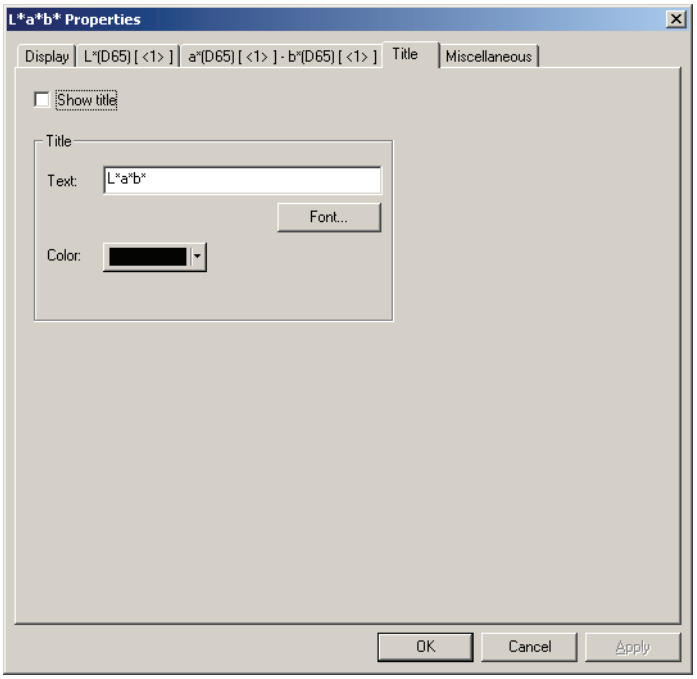
Specify the font to be used for the label text. Be sure to also specify the language when specifying the font in the Font dialog box.

Title - Color

Specify the label color.

See page 154 for the color setting procedure.

4) Title tab



Show title

Select whether to show or hide the title of the graph.

Title - Text

Specify the text for the graph title.

Title - Font

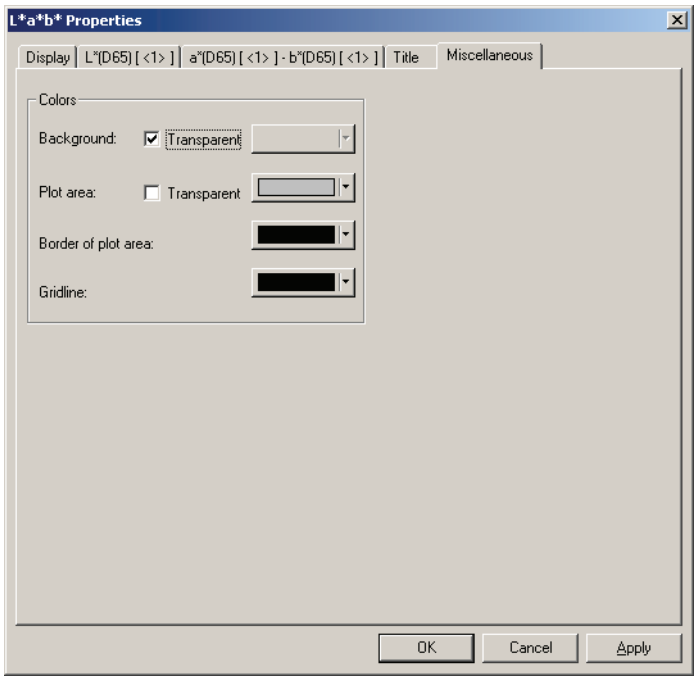
Specify the font to be used for the graph title. Be sure to also specify the language when specifying the font in the Font dialog box.

Title - Color

Specify the color of the graph title.

See page 154 for the color setting procedure.

5) Miscellaneous tab



Colors - Background

Specify the background color of the graphic object.

Transparent When this option is checked, the background is transparent.

Colors - Plot area

Specify the color to be used for the inside of the graph. The color can be changed only when “Show background image” in the “Display” tab on page 212 is not checked.

Transparent When this option is checked, the inside of the graph is transparent.

Colors - Border of plot area

Specify the border color of the graph.

Colors - Gridline

Specify the gridline color of the graph.

See page 154 for the color setting procedure.

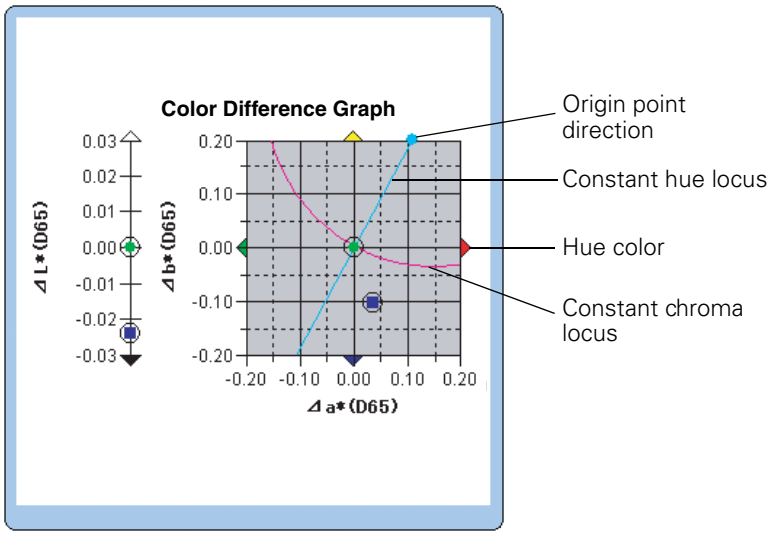
3.3 Color Difference Graph (ΔL*Δa*Δb*, ΔL Δa Δb) Object

3.3.1 Overview

The color difference graph object is used to view the color difference values under the L*a*b* or Hunter Lab color system. The ΔL* or ΔL value is plotted on the left side of the object, and the Δa*-Δb* or Δa-Δb value is plotted on the right side. Depending on the plot type selected, the value of Δa*-Δb* or Δa-Δb, the value of Δa*-ΔL* or Δa-ΔL or the value of Δb*-ΔL* or Δb-ΔL is plotted. The constant hue locus and constant chroma locus for the target data can also be drawn. The tolerance of the color difference can be displayed.

If tolerance is set using the SpectraMagic NX software, measurement data plot points are displayed in the background color of the tolerance total judgement.

The ellipse displayed as a tolerance is shown for reference purposes. If the target has a low saturation, in particular, the shape of the tolerance ellipse for CMC, ΔE^*_{94}, and ΔE^*_{00} will be a little different from the actual calculated value. Consequently, the sample data may be plotted within the ellipse even when it fails judgement, or it may be plotted out of the ellipse even when it passes judgement.

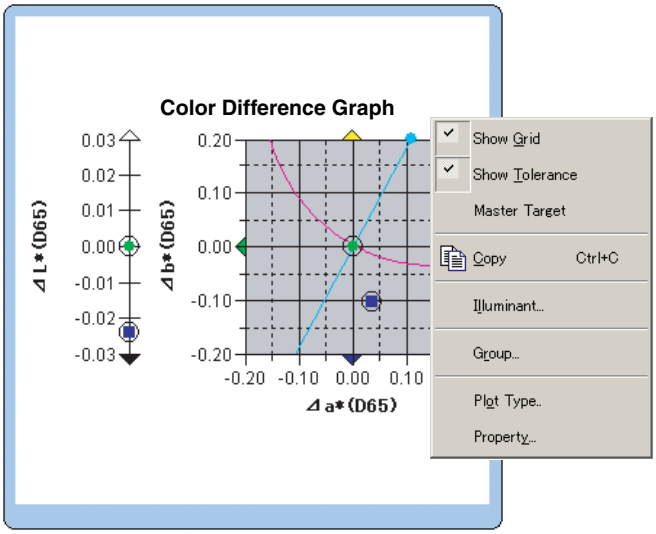


3.3.2 Features

- Plots a color difference graph for the L*a*b* or Hunter Lab color system.
- Indicates the tolerances of color differences [Box tolerance, color difference equation (ΔE*ab, CMC, ΔE^*_{94}, ΔE^*_{00})].
- Draws the constant hue locus and constant chroma locus (for ΔL*Δa*Δb* only).
- Shows the hue color display.
- Graphs can be copied.
- Background, axis, and label colors are selectable.

3.3.3 Right-click Menu

Right-clicking a graphic object opens a context menu showing the available menu items. Table below shows the menu items displayed for the color difference graph object.



Right-click menu of color difference graph (ΔL*a*b*) object

Menu Item	Function
Show Grid	Shows or hides the grid.
Show Tolerance	Shows or hides the tolerance values.
Master Target	Switches the master target between always being located at the origin point and always not being located at the origin point.
Copy	Copies the graphic object to the clipboard.
Illuminant	Shows a dialog box for specifying the illuminant.
Group	Shows a dialog box for specifying the attributes of the data to be plotted.
Plot Type	Shows a dialog box for specifying a space to be drawn. Select one from "ΔL*, Δa*-Δb*" (or "ΔL, Δa-Δb"), "Δa*-Δb*" (or "Δa-Δb"), "Δa*-ΔL*" (or "Δa-ΔL") or "Δb*-ΔL*" (or "Δb-ΔL").
Property	Shows the property dialog box.

See page 286 for the illuminant setting procedure.
See page 287 for the group attribute setting procedure.

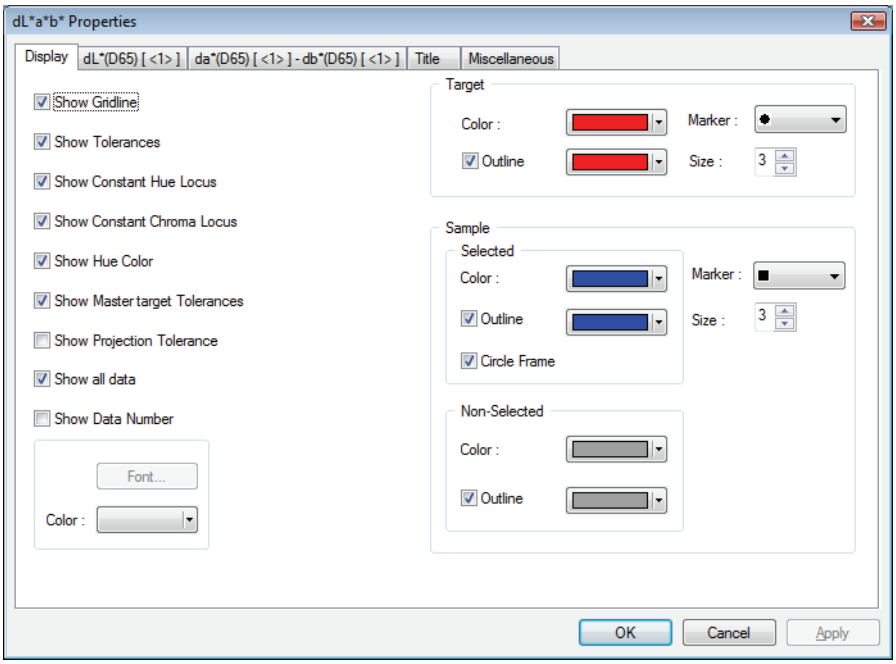
3.3.4 Setting Properties

Selecting Property from the right-click menu displays a dialog box for specifying the properties of the graph. The following five tabs are available for setting the properties of the color difference graph object.

1) Display
2) ΔL* or ΔL (For a plot type of "ΔL*, Δa*-Δb*" (or "ΔL, Δa-Δb") only)
3) Δa*-Δb*, Δa-Δb, Δa*-ΔL*, Δa-ΔL, Δb*-ΔL* or Δb-ΔL
4) Title
5) Miscellaneous

The following sections describe the details of these tabs.

1) Display tab



Show Gridline

Select whether to show or hide gridlines.

Show Tolerances

Select whether to show or hide the tolerances. When two or more pieces of sample data are selected, no tolerances are displayed even if this option is checked.

Show Constant Hue Locus (Only for ΔL*Δa*Δb*)

Select whether to show or hide the constant hue locus.

Show Constant Chroma Locus (Only for ΔL*Δa*Δb*)

Select whether to show or hide the constant chroma locus.

Show Hue Color (Only for ΔL*Δa*Δb*)

Select whether to show or hide the hue color display. The hue color display is shown by the arrowheads in four colors indicating the hue direction at the four sides of the color difference graph. The green arrow indicates the -a* direction, the red arrow the +a* direction, the blue arrow the -b* direction, and the yellow arrow the +b* direction.

Show Master target Tolerances

Select whether to show or hide the tolerance specified for the master target.

Show Projection Tolerance

Select whether to show or hide additional ellipse showing projection of tolerance ellipse onto graph plane.

Show all data

Select whether to show or hide all the data. If Show all data is not checked, the selected data is displayed.

Show Data Number

Select whether to show or hide the data number shown on the list.

Font Specify the font of the number.

Color Specify the color of the number.

Target - Color

Specify the display color of the target data.

Target - Outline

Specify the color of the outline of the plot points. When this option is not checked, the color of the outline cannot be specified.

Target - Marker

Specify ●, ■, X or + as the marker type for plotting the target data.

Target - Size

Specify the size of the plot points.

Sample - Selected - Color

Specify the display color of the sample data being selected in the list window.

Sample - Selected - Outline

Specify the color of the outline of the plot points. When this option is not checked, the color of the outline cannot be specified.

Sample - Selected - Circle Frame

Draw a circle around the plot points of the selected data.

Sample - Non-Selected - Color

Specify the display color of the sample data that is not being selected in the list window.

Sample - Non-Selected - Outline

Specify the color of the outline of the plot points. When this option is not checked, the color of the outline cannot be specified.

Sample - Marker

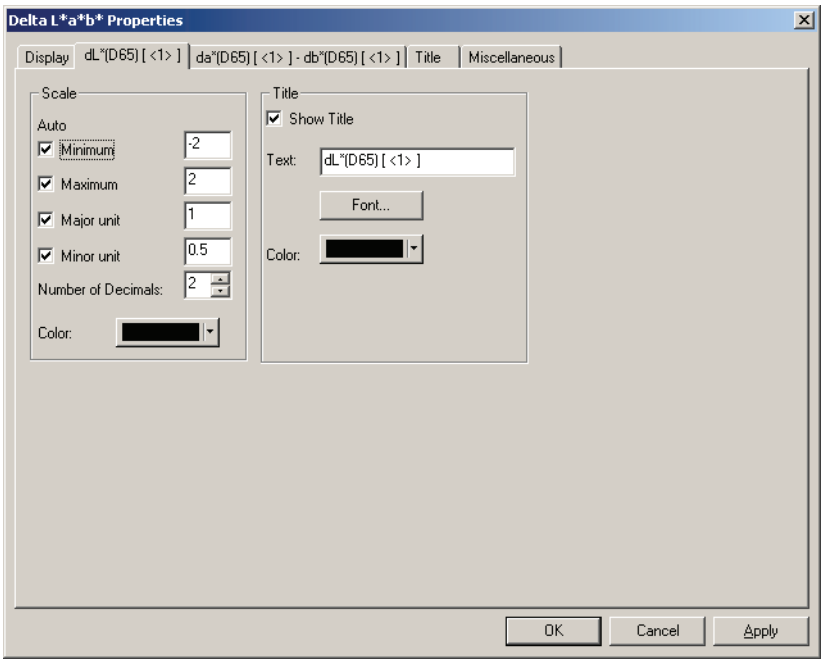
Specify ●, ■, X or + as the marker type for plotting the sample data.

Sample - Size

Specify the size of the plot points.

See page 154 for the color setting procedure.

2) Lightness axis (ΔL* or ΔL) tab



Scale - Auto [Minimum, Maximum, Major unit, Minor unit]

Specify whether to use the automatic setting of the scale for the lightness axis. When Auto is selected, these items are automatically determined according to the minimum and maximum values of the data.

Scale - Value [Minimum, Maximum, Major unit, Minor unit]

Specify the minimum value, maximum value, major unit and minor unit of the scale for the lightness axis.

Scale - Number of Decimals

Specify the number of decimal places to be displayed.

Scale - Color

Specify the scale color of the lightness axis.

Title - Show Title

Select whether to show or hide the title text of the lightness axis.

Title - Text

Specify the label text appearing on the lightness axis.

Title - Font

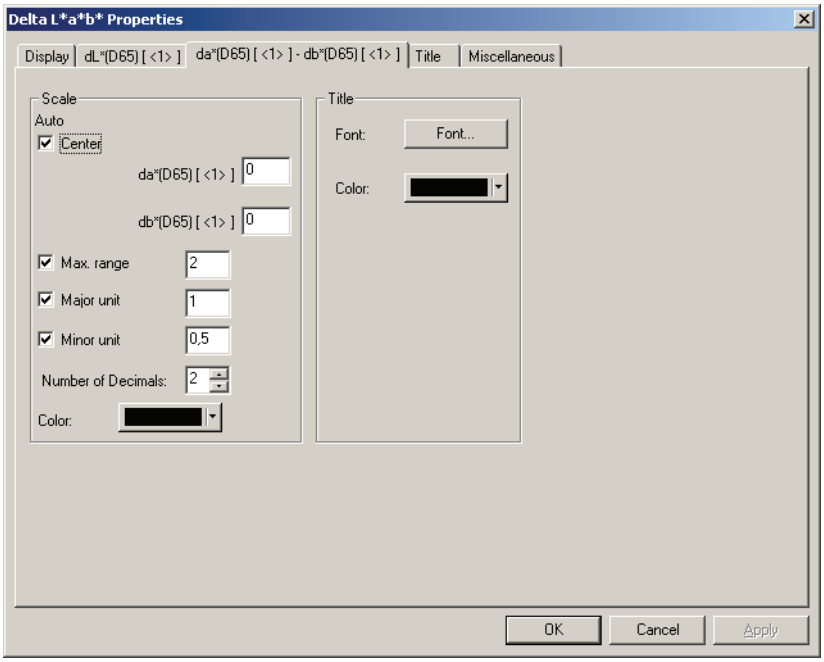
Specify the font to be used for the label appearing on the lightness axis. Be sure to also specify the language when specifying the font in the Font dialog box.

Title - Color

Specify the label color of the lightness axis.

See page 154 for the color setting procedure.

3) Chromaticity axis (Δa*-Δb*, Δa-Δb, Δa*-ΔL*, Δa-ΔL, Δb*-ΔL* or Δb-ΔL) tab



Scale - Auto [Center, Max. range, Major unit, Minor unit]

Specify whether to use the automatic setting of the scale. When Auto is selected, these items are automatically determined according to the minimum and maximum values of the data.

Scale - Center

Specify the coordinates of the center of the display area in the color space.

Scale - Max. range

Specify the distance (maximum range) from the center in order to limit the display area.

Scale - Value [Major unit, Minor unit]

Specify the major and minor units of the scale.

Scale - Number of Decimals

Specify the number of decimal places to be displayed.

Scale - Color

Specify the scale color.

Title - Font

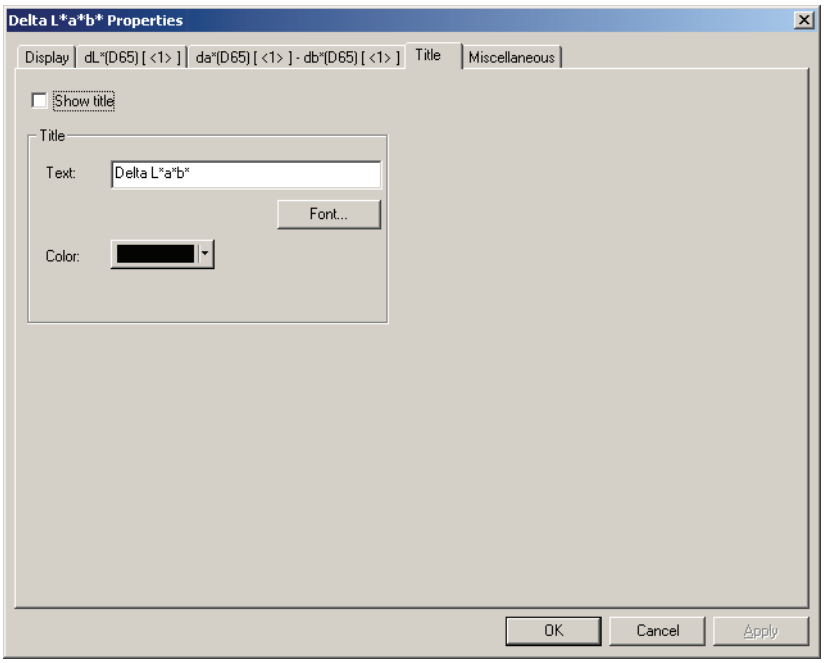
Specify the font to be used for the label text. Be sure to also specify the language when specifying the font in the Font dialog box.

Title - Color

Specify the label color.

See page 154 for the color setting procedure.

4) Title tab



Show title

Select whether to show or hide the title of the graph.

Title - Text

Specify the text for the graph title.

Title - Font

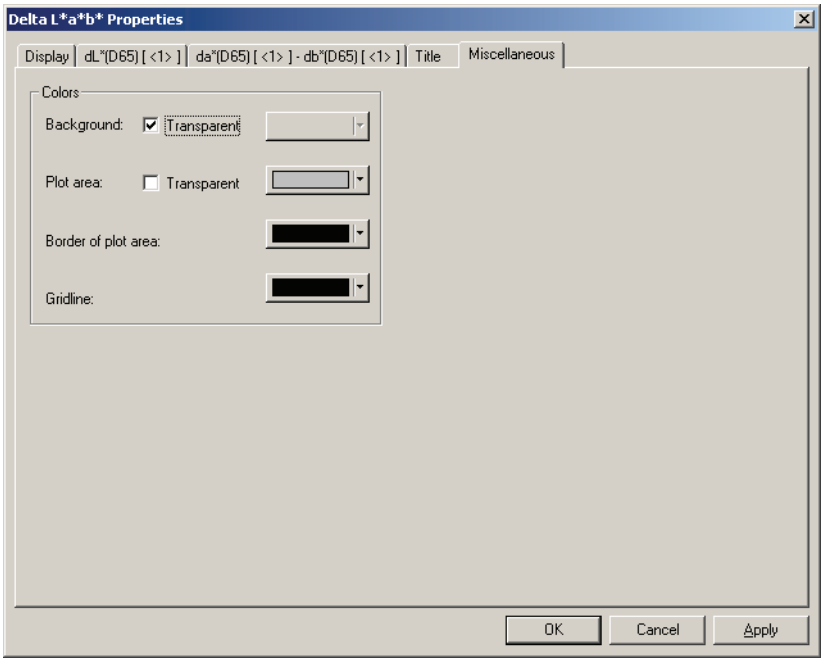
Specify the font to be used for the graph title. Be sure to also specify the language when specifying the font in the Font dialog box.

Title - Color

Specify the color of the graph title.

See page 154 for the color setting procedure.

5) Miscellaneous tab



Colors - Background

Specify the background color of the graphic object.

Transparent When this option is checked, the background is transparent.

Colors - Plot area

Specify the color to be used for the inside of the graph.

Transparent When this option is checked, the inside of the graph is transparent.

Colors - Border of plot area

Specify the border color of the graph.

Colors - Gridline

Specify the gridline color of the graph.

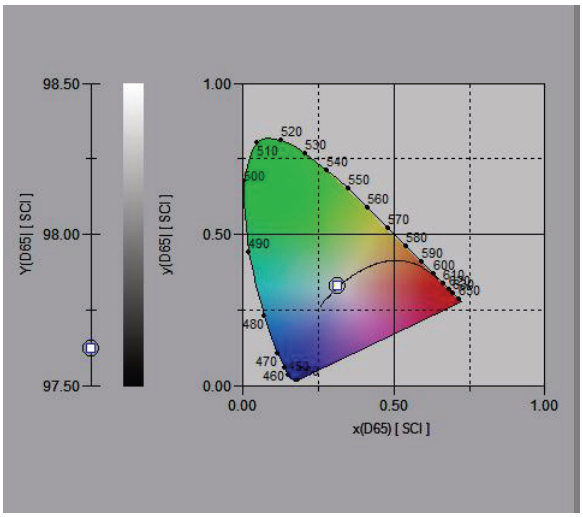
See page 154 for the color setting procedure.

3.4 xy Chromaticity Diagram Ⓟ

3.4.1 Overview

The chromaticity diagram object is a graph to show the absolute values of xy.
The Y value is plotted on the left side of the object, and the values of x-y are plotted on the right side.
Also, when list items are set to the signal color index, they are plotted in the xy chromaticity diagram on the right side of the object.
Depending on the plot type selected, you can hide the Y value by selecting an appropriate plot type.

This function is supported by the SpectraMagic NX Professional Edition only. The graph will display in the Lite Edition, but the data will not be plotted.

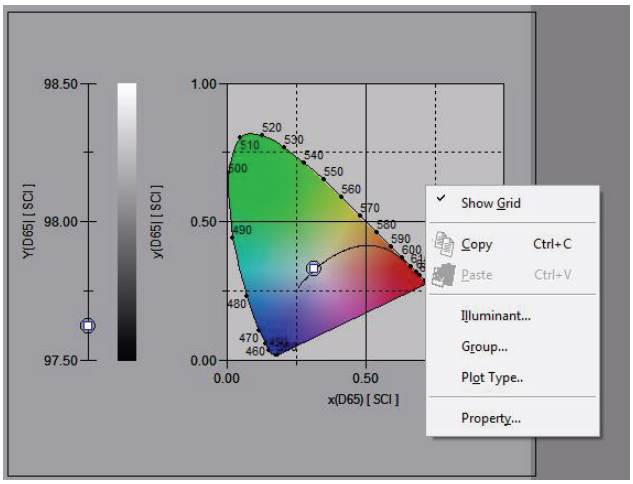


3.4.2 Features

- Displays the absolute values of Yxy
- Shows a horseshoe-shaped color display of the x-y space
- The graph can be copied.
- The color of the graph can be specified (background color, axis color and label color).

3.4.3 Right-click Menu

Right-clicking a graphic object opens a context menu showing the menu items available.
Table below shows the menu items displayed for the chromaticity diagram object.



Right-click menu of chromaticity diagram object

Menu Item	Function
Show Grid	Shows or hides the grid.
Copy	Copies the graphic object to the clipboard.
Illuminant	Shows a dialog box for specifying the illuminant.
Group	Shows a dialog box for specifying the attributes of the data to be plotted.
Plot Type	Shows the dialog box for specifying a space to be drawn. Select to show or hide the Y display.
Property	Shows the property dialog box for the graph.

See page 287 for the group attribute setting procedure.

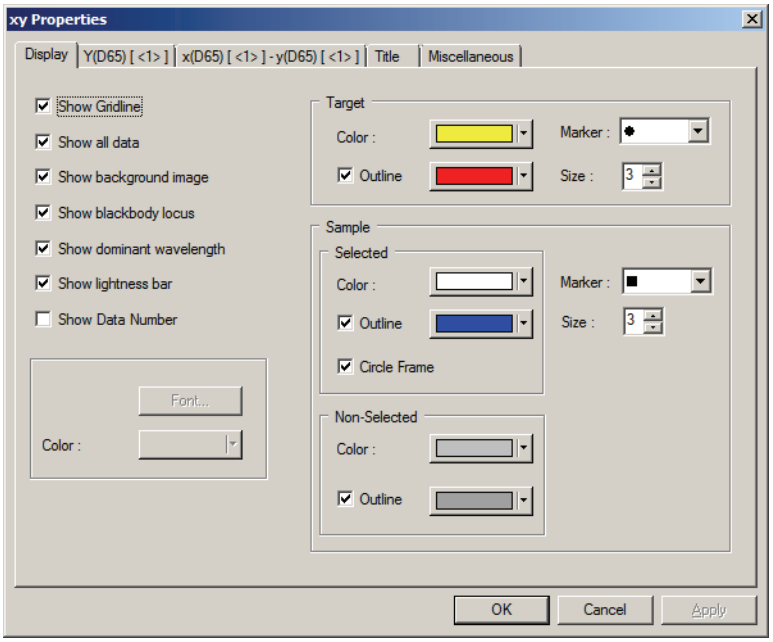
3.4.4 Property

Selecting Property from the right-click menu displays a dialog box for specifying the properties of the graph.
The following tabs are available for setting the properties.

1) Display
2) Y
3) x-y
4) Title
5) Miscellaneous

The following sections describe the details of these tabs.

1) Display tab



Show Gridline

Select whether to show or hide gridlines.

Show all data

Select whether to show or hide all data of the list on the chromaticity diagram.

Show background image

Select whether to show or hide the pseudocolor of the x-y space.

Show blackbody locus

Select whether to show or hide the blackbody locus on the chromaticity diagram.

Show dominant wavelength

Select whether to show or hide the dominant wavelength line and label on the chromaticity diagram.

Show Data Number

Select whether to show or hide the data number shown on the list.

Font Specify the font of the number.

Color Specify the color of the number.

Target - Color

Specify the display color of the target data.

Target - Outline

Specify the color of the outline of the plot points. When this option is not checked, the color of the outline cannot be specified.

Target - Marker

Specify ●, ■ or X as the marker type for plotting the target data.

Target - Size

Specify the size of the plot points.

Sample - Selected - Color

Specify the display color of the sample data being selected in the list window.

Sample - Selected - Outline

Specify the color of the outline of the plot points. When this option is not checked, the color of the outline cannot be specified.

Sample - Selected - Circle Frame

Draw a circle around the plot points of the selected data.

Sample - Non-Selected - Color

Specify the display color of the sample data that is not being selected in the list window.

Sample - Non-Selected - Outline

Specify the color of the outline of the plot points. When this option is not checked, the color of the outline cannot be specified.

Sample - Marker

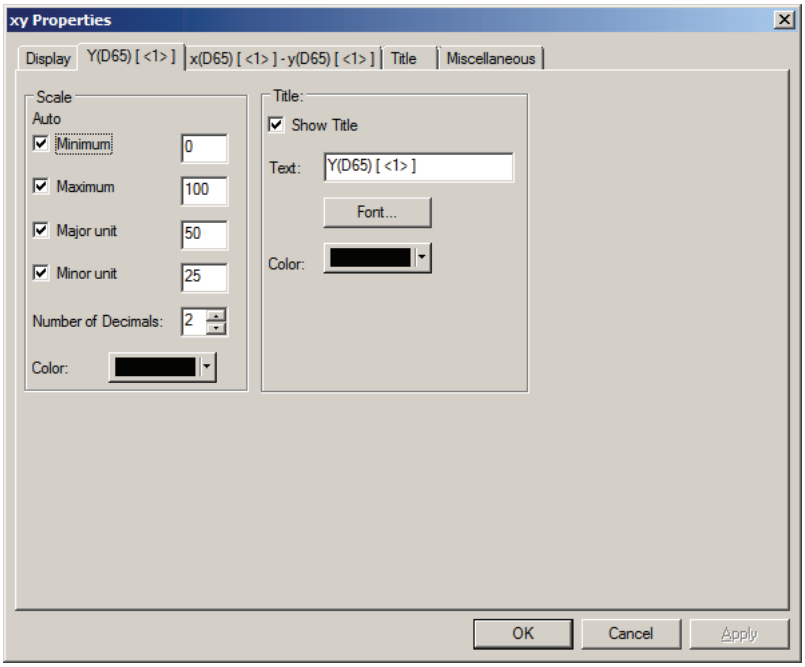
Specify ●, ■ or X as the marker type for plotting the sample data.

Sample - Size

Specify the size of the plot points.

See page 154 for the color setting procedure.

2) Y axis tab



Scale - Auto [Minimum, Maximum, Major unit, Minor unit]

Specify whether to use the automatic setting of the scale for the Y axis. When Auto is selected, these items are automatically determined according to the minimum and maximum values of the data.

Scale - Value [Minimum, Maximum, Major unit, Minor unit]

Specify the minimum value, maximum value, major unit and minor unit of the scale for the Y axis.

Scale - Number of Decimals

Specify the number of decimal places to be displayed.

Scale - Color

Specify the scale color of the Y axis.

Title - Show Title

Select whether to show or hide the title text of the Y axis.

Title - Text

Specify the label text appearing on the Y axis.

Title - Font

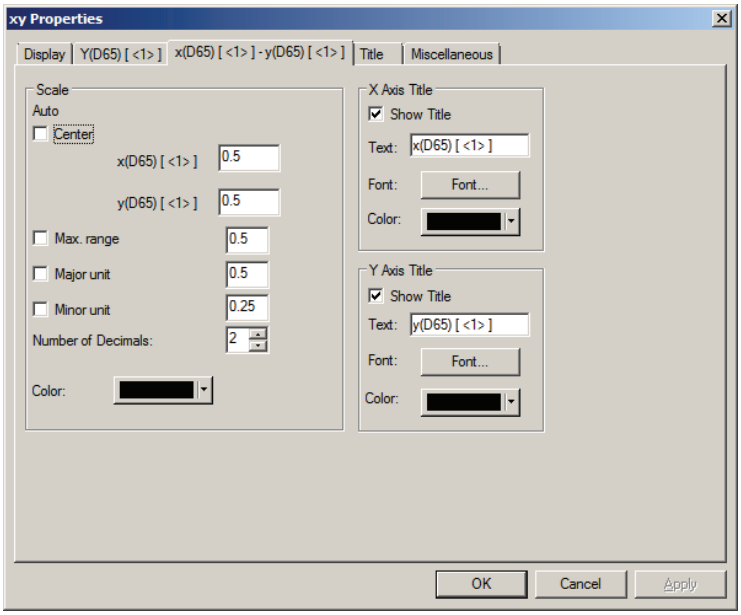
Specify the font to be used for the label appearing on the Y axis. Be sure to also specify the language when specifying the font in the Font dialog box.

Title - Color

Specify the label color of the Y axis.

See page 154 for the color setting procedure.

3) Chromaticity axis (x-y) tab



Scale - Auto [Center, Max. range, Major unit, Minor unit]

Specify whether to use the automatic setting of the scale for the chromaticity axis. When Auto is selected, these items are automatically determined according to the minimum and maximum values of the data.

Scale - Center

Specify the coordinates of the center of the display area in the x-y space.

Scale - Max. range

Specify the distance (maximum range) from the center to determine the display area.

Scale - Value [Major unit, Minor unit]

Specify the major and minor intervals of the scales.

Scale - Number of Decimals

Specify the number of decimal places to be displayed.

Scale - Color

Specify the scale color of the chromaticity axis.

x Axis Title - Show Title/y Axis Title - Show Title

Select whether to show or hide the title text of the x-axis (y-axis).

x Axis Title - Text/y Axis Title - Text

Specify the title name of the x-axis (y-axis).

x Axis Title - Font/y Axis Title - Font

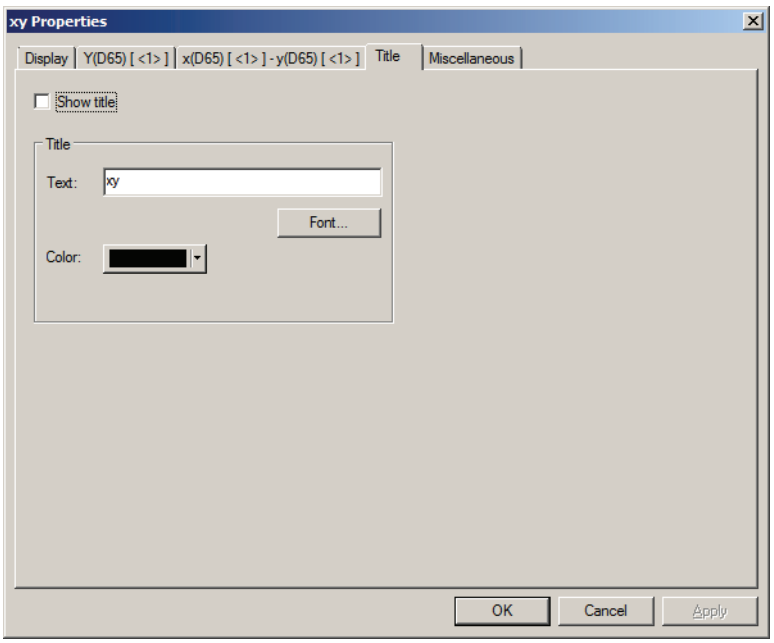
Specify the font to be used for the label appearing on the chromaticity axis. Be sure to also specify the type when specifying the font in the Font dialog box.

x Axis Title - Color/y Axis Title - Color

Specify the label color of the chromaticity axis.

See page 154 for the color setting procedure.

4) Title tab



Show title

Select whether to show or hide the title of the chart.

Title - Text

Specify the text for the chart title.

Title - Font

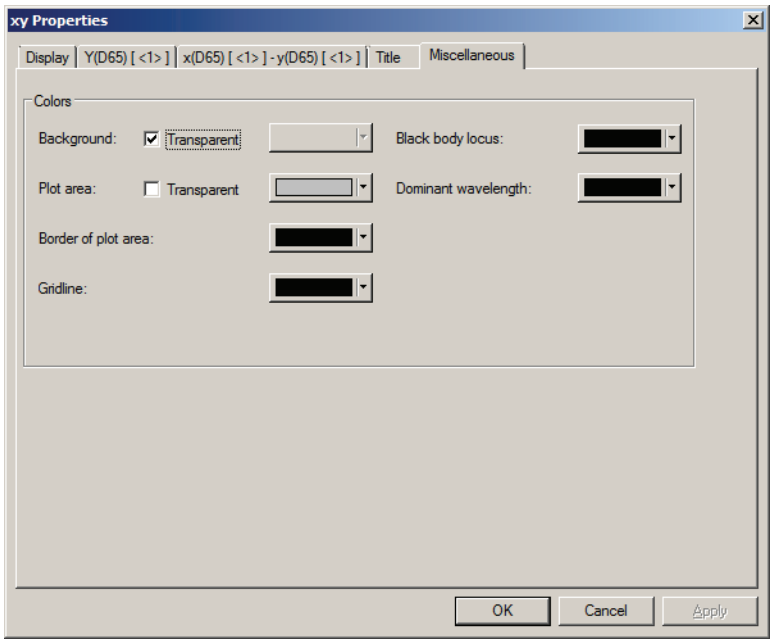
Specify the font to be used for the chart title. Be sure to also specify the type when specifying the font in the Font dialog box.

Title - Color

Specify the color of the chart title.

See page 154 for the color setting procedure.

5) Miscellaneous tab



Colors - Background

Specify the background color of the graphic object.

Transparent When this option is checked, the background is transparent.

Colors - Plot area

Specify the color to be used for the inside of the graph. The color can be changed only when “Show background image” in the “Display tab” on page 228 is not checked.

Transparent When this option is checked, the inside of the graph is transparent.

Colors - Border of plot area

Specify the border color of the graph.

Colors - Gridline

Specify the gridline color of the graph.

Colors - Black body locus

Specify the color of the black body.

Colors- Dominant wavelength

Specify the color of the dominant wavelength line and label.

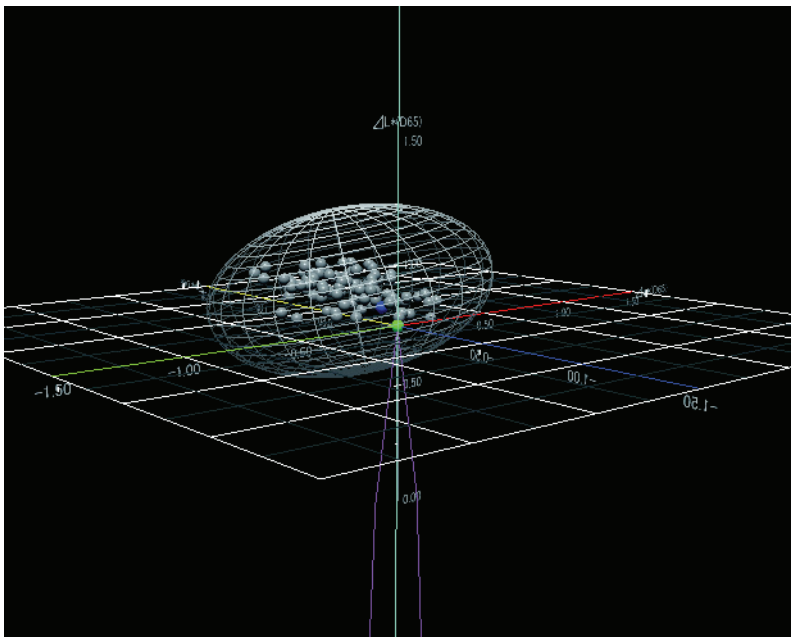
See page 154 for the color setting procedure.

3.5 3D Graph (ΔL*Δa*Δb*)

3.5.1 Overview

The 3D graph object is a graph to show an L*a*b* color space using a 3D space.
It shows the values of ΔL*, Δa* and Δb* as well as the tolerance of color difference, allowing a visual check of whether each plot point is within the tolerance space.
For easier recognition of the space, the graph is shown as if it were lit from a certain angle.
You can rotate the 3D graph by holding down the space bar and moving the mouse (with the left button held down). You can also zoom the 3D graph in or out by holding down the space bar and rotating the mouse wheel forward or backward.

*The ellipse displayed as a tolerance is shown for reference purposes. If the target has a low saturation, in particular, the shape of the tolerance ellipse for CMC, ΔE^*_{94}, and ΔE_{00} will be a little different from the actual calculated value. Consequently, the sample data may be plotted within the ellipse even when it fails judgement, or it may be plotted out of the ellipse even when it passes judgement.

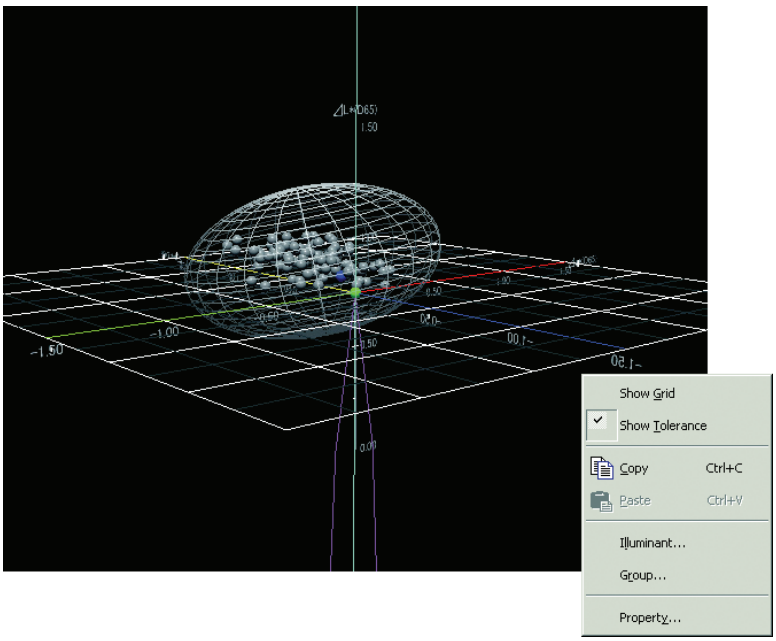


3.5.2 Features

- Plots a color difference graph for the L*a*b* color space.
- Shows a wire frame representing the tolerances of color differences (cube, ellipsoid).
- Draws the constant hue locus and constant chroma locus.
- Shows the hue color display.
- 3D representation (axis rotation, zooming in/out, light direction setting)
- Graphs can be copied.
- Background, axis, and label colors are selectable.

3.5.3 Right-click Menu

Right-clicking a graphic object opens a context menu showing the available menu items.
The table below shows the menu items displayed for the 3D graph object.



Right-click menu of 3D graph (□ΔL*Δa*Δb*) object

Menu Item	Function
Show Grid	Shows or hides the grid.
Show Tolerance	Shows or hides the tolerance values.
Copy	Copies the graphic object to the clipboard.
Illuminant	Shows a dialog box for specifying the illuminant.
Group	Shows a dialog box for specifying the attributes of the data to be plotted.
Property	Shows the property dialog box.

See page 286 for the illuminant setting procedure.
See page 287 for the group attribute setting procedure.

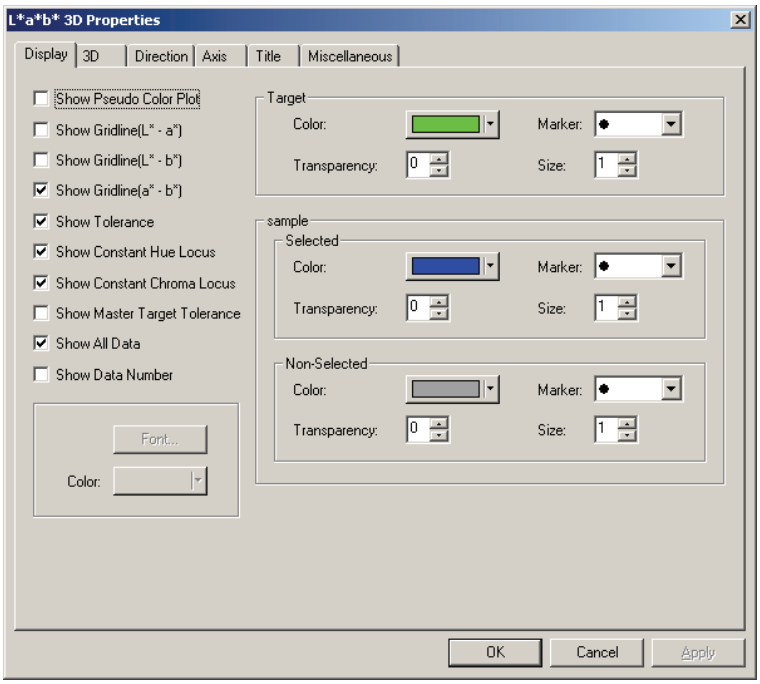
3.5.4 Setting Properties

Selecting Property from the right-click menu displays a dialog box for specifying the properties of the graph. The following six tabs are available for setting the properties of the 3D graph object.

1) Display
2) 3D
3) Direction
4) Axis
5) Title
6) Miscellaneous

The following sections describe the details of these tabs.

1) Display tab



Show Pseudo Color Plot

When this option is checked, the results of selecting Target - Color and Sample - Non-Selected - Color are displayed with the pseudo color.

Show Gridline (L* - a*)

Select whether to show or hide gridlines.

Show Gridline (L* - b*)

Select whether to show or hide gridlines.

Show Gridline (a* - b*)

Select whether to show or hide gridlines.

Show Tolerance

Select whether to show or hide the tolerances.

Show Constant Hue Locus

Select whether to show or hide the constant hue locus.

Show Constant Chroma Locus

Select whether to show or hide the constant chroma locus.

Show Master Target Tolerance

Select whether to show or hide the tolerance specified for the master target.

Show All Data

Select whether to show or hide all the data.

Show Data Number

Select whether to show or hide the data number shown on the list.

Font Specify the font of the number.

Color Specify the color of the number.

Target - Color

Specify the display color of the target data.

Target - Transparency

Specify the transparency of the target data.

Target - Marker

Specify ●, ■, X or + as the marker type for plotting the target data.

Target - Size

Specify the size of the plot points.

Sample - Selected - Color

Specify the display color of the sample data being selected in the list window.

Sample - Selected - Transparency

Specify the transparency of the sample data that is being selected in the list window.

Sample - Selected - Marker

Specify ●, ■, X or + as the marker type for plotting the sample data.

Sample - Selected - Size

Specify the size of the plot points.

Sample - Non-Selected - Color

Specify the display color of the sample data that is not being selected in the list window.

Sample - Non-Selected - Transparency

Specify the transparency of the sample data that is not being selected in the list window.

Sample - Non-Selected - Marker

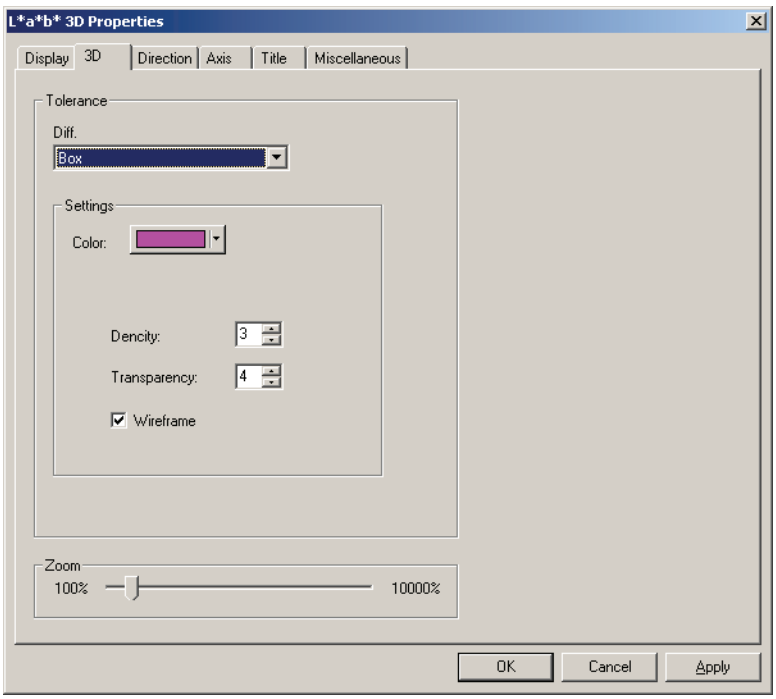
Specify ●, ■, X or + as the marker type for plotting the sample data that is not selected in the list window.

Sample - Non-Selected - Size

Specify the size of the plot points of the sample data that is not selected in the list window.

See page 154 for the color setting procedure.

2) 3D tab



Tolerance - Diff.

Select the type of tolerance.
Selectable item: Box, color difference equation (ΔE*ab, CMC, ΔE^*_{94}, ΔE_{00}, L*C*h, Free Ellipse)
Selection is available from a total of 14 types, 7 for the working target data and 7 for the master target data. Note, however, that the working target data is supported by the SpectraMagic NX Professional Edition only.

Tolerance - Settings - Color

Specify the color applied to the tolerance cube or ellipsoid.

Tolerance - Settings - Density

Specify the mesh density of the tolerance cube or ellipsoid.

Tolerance - Settings - Transparency

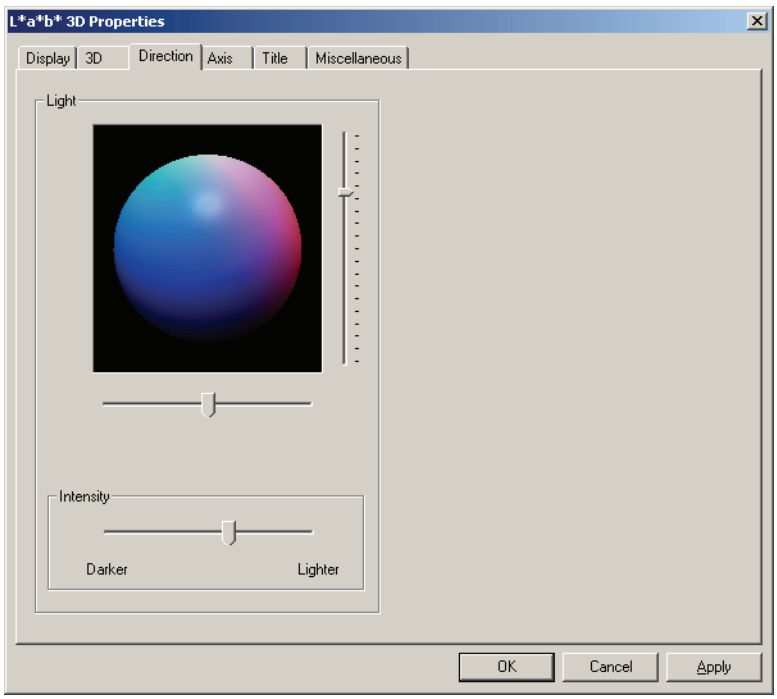
Specify the transparency of the tolerance cube or ellipsoid.

Tolerance - Settings - Wireframe

Select whether to show or hide the wire frame representing the tolerance cube or ellipsoid.

See page 154 for the color setting procedure.

3) Direction tab



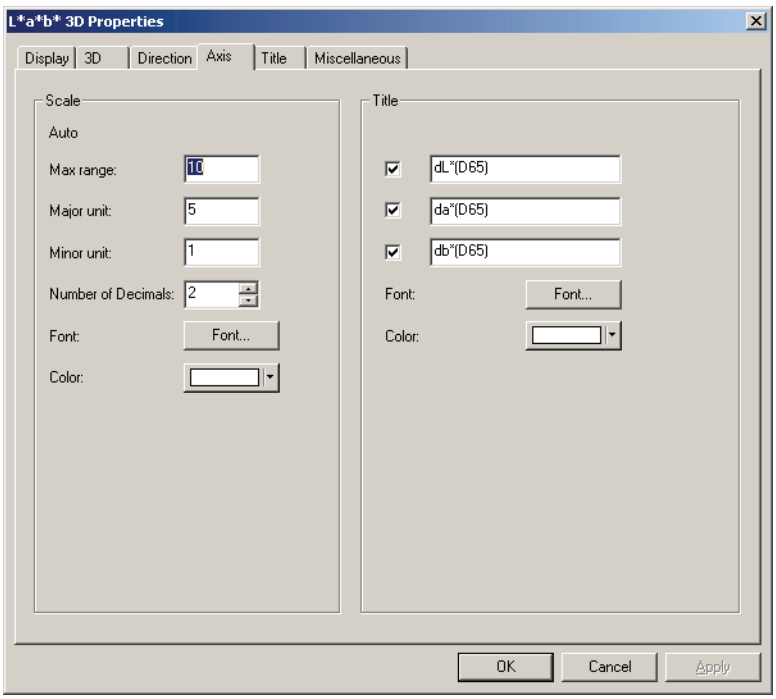
Light

Specify the direction of the light by moving the slider.

Light - Intensity

Specify the brightness of the light by moving the slider.

4) Axis tab



Scale - Value (Max range, Major unit, Minor unit)

Specify the maximum range, major unit and minor unit of the axis scale.

Scale - Number of Decimals

Specify the number of decimal places to be displayed.

Scale - Font

Specify the font to be used for the axis scale.
Be sure to also specify the language when specifying the font in the Font dialog box.

Scale - Color

Specify the color of the axis scale.

Title

Select whether to show or hide an axis title, and specify the title.

Title - Font

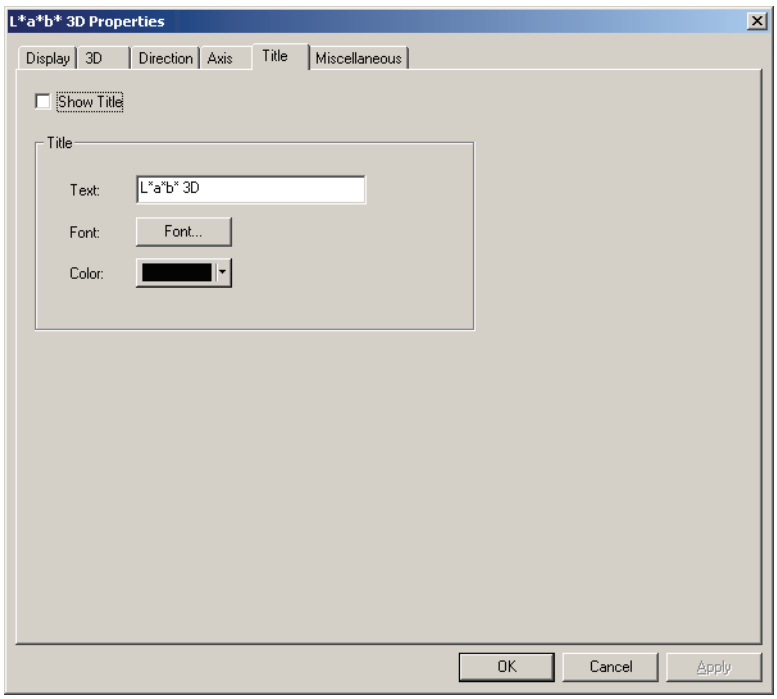
Specify the font to be used for the label appearing on the axis.
Be sure to also specify the language when specifying the font in the Font dialog box.

Title - Color

Specify the label color of the lightness axis.

See page 154 for the color setting procedure.

5) Title tab



Show Title

Select whether to show or hide the title of the graph.

Title - Text

Specify the text for the graph title.

Title - Font

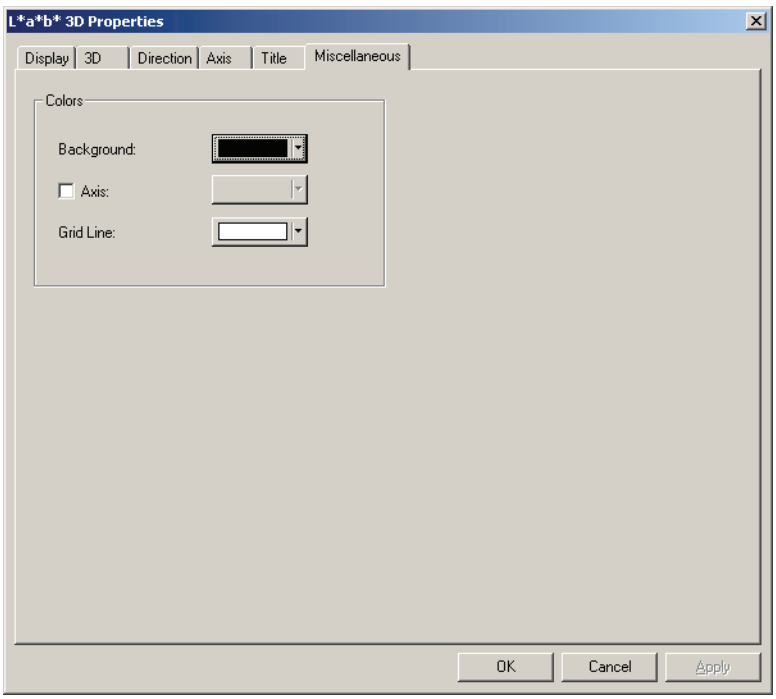
Specify the font to be used for the graph title. Be sure to also specify the language when specifying the font in the Font dialog box.

Title - Color

Specify the color of the graph title.

See page 154 for the color setting procedure.

6) Miscellaneous tab



Colors - Background

Specify the background color of the graphic object.

Colors - Axis

When this option is checked, the axis is displayed with the pseudo color.
When this option is not checked, you need to specify the color of the axis.

Colors - Grid Line

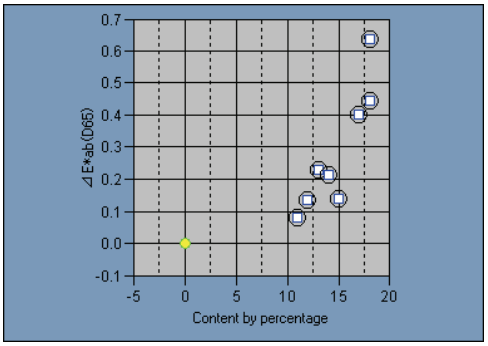
Specify the gridline color of the graph.

See page 154 for the color setting procedure.

3.6 Two-axis Graph 

3.6.1 Overview

The two-axis graph object is a graph to indicate the relationship between two items such as colorimetric data selected as list items. The relationship is indicated by specifying them on two axes.

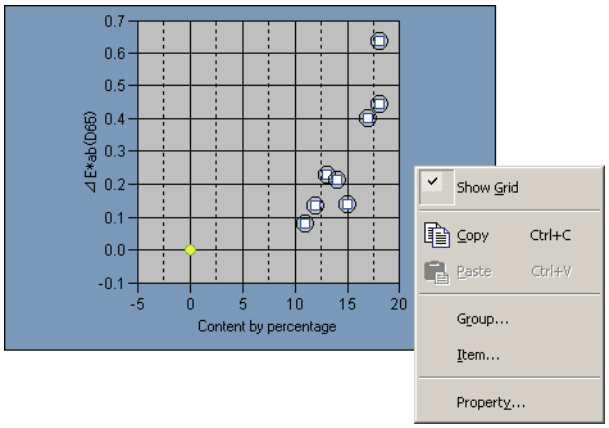


3.6.2 Features

- Graphs can be copied.
- Background, axis, and label colors are selectable.

3.6.3 Right-click Menu

Right-clicking a graphic object opens a context menu showing the available menu items.
The table below shows the menu items displayed for the two-axis graph object.



Right-click menu of the two-axis graph object

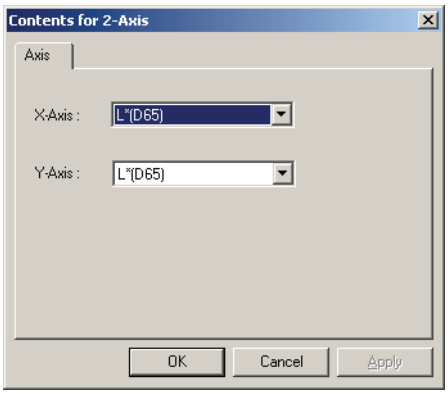
Menu Item	Function
Show Grid	Shows or hides the grid.
Copy	Copies the graphic object to the clipboard.
Group	Shows a dialog box for specifying the attributes of the data to be plotted.
Item	Shows a dialog box for specifying the target data used for judgement and the display style.
Property	Shows the property dialog box.

See page 287 for the group attribute setting procedure.

3.6.4 Setting Items

Selecting Item from the right-click menu displays a dialog box for specifying the colorimetric data to be displayed in the two-axis graph.

1) Axis tab



X-Axis, Y-Axis

Select the item to be displayed, such as colorimetric data.

3.6.5 Setting Properties

Selecting Property from the right-click menu displays a dialog box for specifying the properties of the graph. The following five tabs are available for setting the properties of the two-axis graph object.

1) Display

2) X-axis specified in the Contents for 2-Axis dialog box

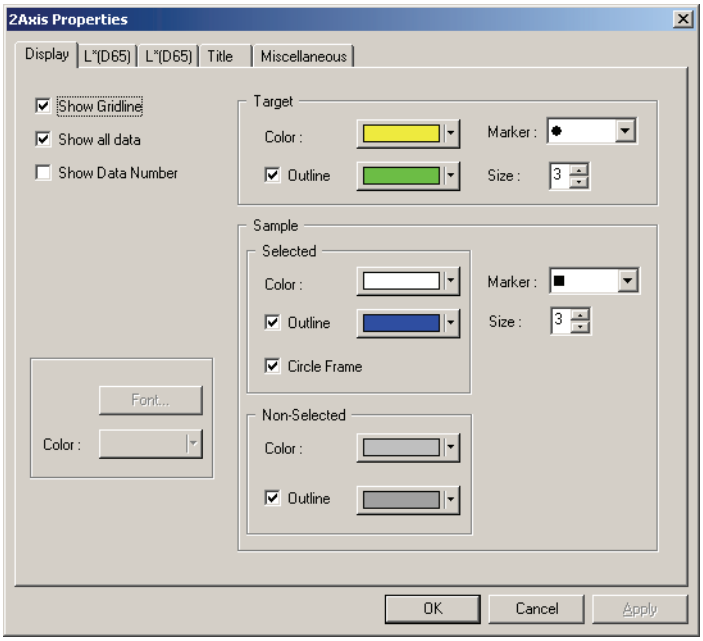
3) Y-axis specified in the Contents for 2-Axis dialog box

4) Title

5) Miscellaneous

The following sections describe the details of these tabs.

1) Display tab



Show Gridline

Select whether to show or hide gridlines.

Show all Data

Select whether to show or hide all the data.

Show Data Number

Select whether to show or hide the data number shown on the list.

Font Specify the font of the number.

Color Specify the color of the number.

Target - Color

Specify the display color of the target data.

Target - Outline

Specify the color of the outline of the plot points. When this option is not checked, the color of the outline cannot be specified.

Target - Marker

Specify ●, ■, X or + as the marker type for plotting the target data.

Target - Size

Specify the size of the plot points.

Sample - Selected - Color

Specify the display color of the sample data being selected in the list window.

Sample - Selected - Outline

Specify the color of the outline of the plot points. When this option is not checked, the color of the outline cannot be specified.

Sample - Non-Selected - Color

Specify the display color of the sample data that is not being selected in the list window.

Sample - Non-Selected - Outline

Specify the color of the outline of the plot points. When this option is not checked, the color of the outline cannot be specified.

Sample - Marker

Specify ●, ■, X or + as the marker type for plotting the sample data.

Sample - Size

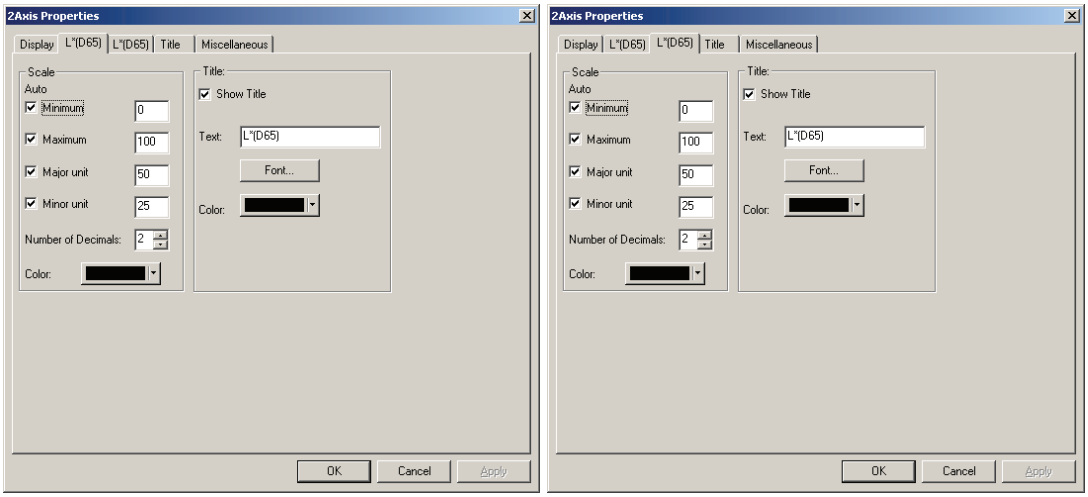
Specify the size of the plot points.

See page 154 for the color setting procedure.

2) X-axis specified in the Contents for 2-Axis dialog box

3) Y-axis specified in the Contents for 2-Axis dialog box

Specify the properties of the axis for the item such as colorimetric data selected in the Contents for 2-Axis dialog. The selected colorimetric data is shown as the name of the tab.



Scale - Auto (Maximum, Major unit, Minor unit)

Specify whether to use the automatic setting of the axis scale.
When Auto is selected, these items are automatically determined according to the minimum and maximum values of the data.

Scale - Value (Minimum, Maximum, Major unit, Minor unit)

Specify the minimum value, maximum value, major unit and minor unit of the axis scale.

Scale - Number of Decimals

Specify the number of decimal places to be displayed.

Scale - Color

Specify the scale color of the lightness axis.

Title - Show Title

Select whether to show or hide an axis title.

Title - Text

Specify the axis title.

Title - Font

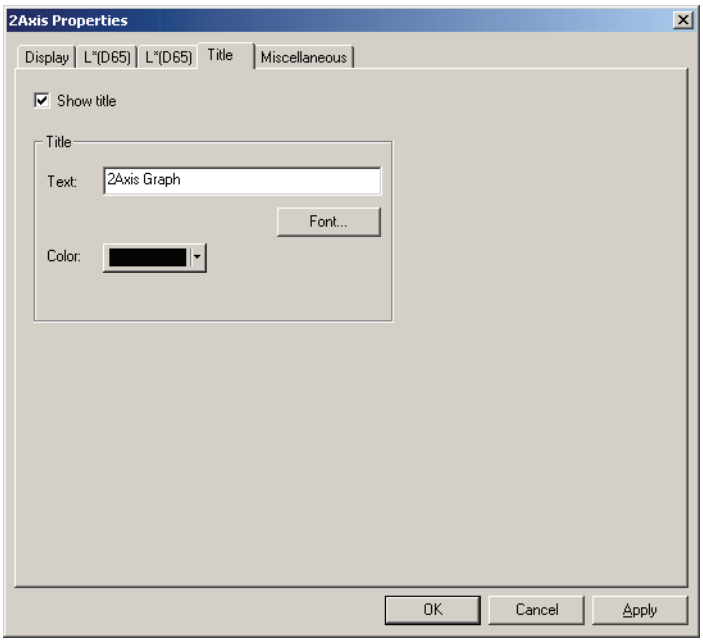
Specify the font to be used for the title.
Be sure to also specify the language when specifying the font in the Font dialog box.

Title - Color

Specify the color of the title.

See page 154 for the color setting procedure.

4) Title tab



Show title

Select whether to show or hide the title of the graph.

Title - Text

Specify the text for the graph title.

Title - Font

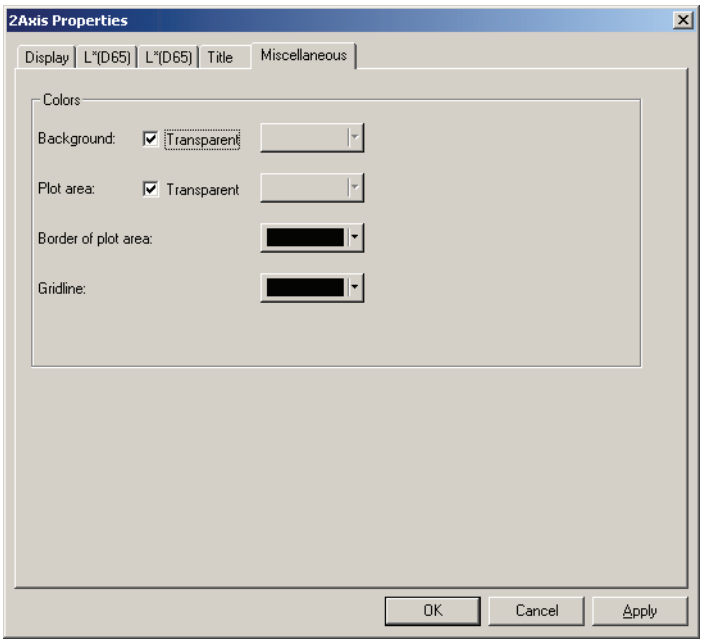
Specify the font to be used for the graph title.
Be sure to also specify the language when specifying the font in the Font dialog box.

Title - Color

Specify the color of the graph title.

See page 154 for the color setting procedure.

5) Miscellaneous tab



Colors - Background

Specify the background color of the graphic object.
Transparent When this option is checked, the background is transparent.

Colors - Plot area

Specify the color to be used for the inside of the graph. The color can be changed only when “Show background image” in the “Display” tab on page 246 is not checked.
Transparent When this option is checked, the inside of the graph is transparent.

Colors - Border of plot area

Specify the border color of the graph.

Colors - Gridline

Specify the gridline color of the graph.

See page 154 for the color setting procedure.

3.7 Data List Object

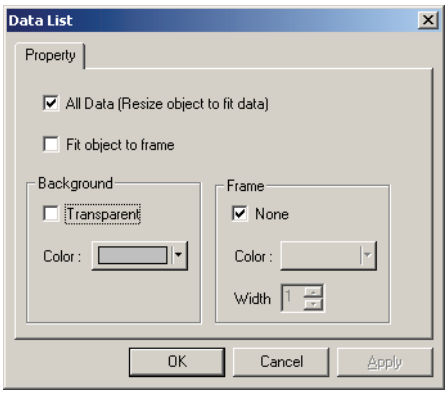
3.7.1 Overview

The data list object is used to view the list data that is currently active in the list window.

3.7.2 Setting Properties

Selecting Property from the right-click menu displays a dialog box for specifying the properties of the graph.
The following tab is available for setting the properties of the data list object.

1) Property tab



All Data

When this option is checked, the contents that are the same as the list data are displayed. When "Fit object to frame" is not checked, only the data that fits in the range of the data list object is displayed. If All Data is not checked, only the target data is displayed.

Fit object to frame

When this option is checked, all the list data is displayed within the range of the data list object.

Background - Transparent

Select whether to fill in the background.

Background - Color

Specify the background color of the graphic object.

Frame - None

Select whether to draw the frame of the graphic object.

Frame - Color

Specify the color of the frame of the graphic object.

Frame - Width

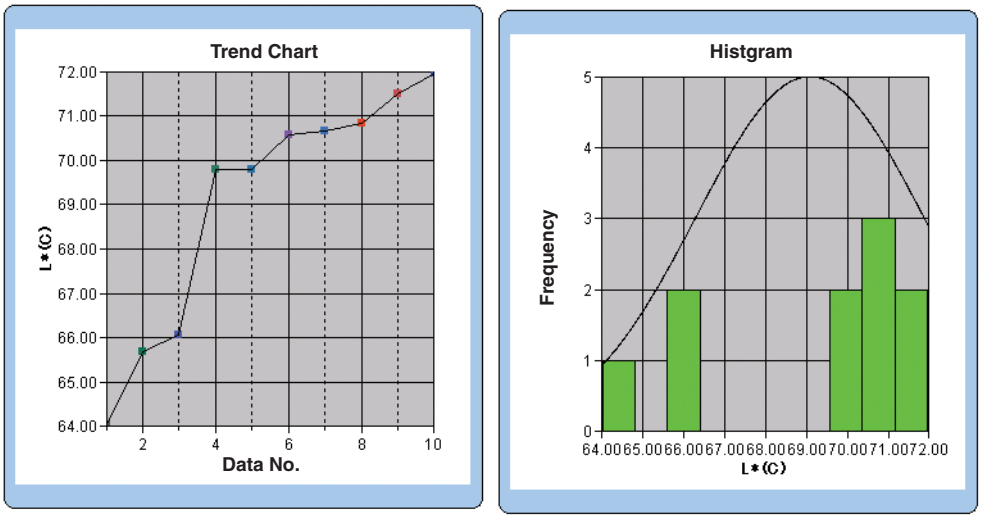
Specify the width of the frame of the graphic object.

See page 154 for the color setting procedure.

3.8 Trend Chart/Histogram Object

3.8.1 Overview

This object is used to view the trend of the specific color value and color difference value. The data of the trend chart can also be displayed as a histogram or normal distribution.

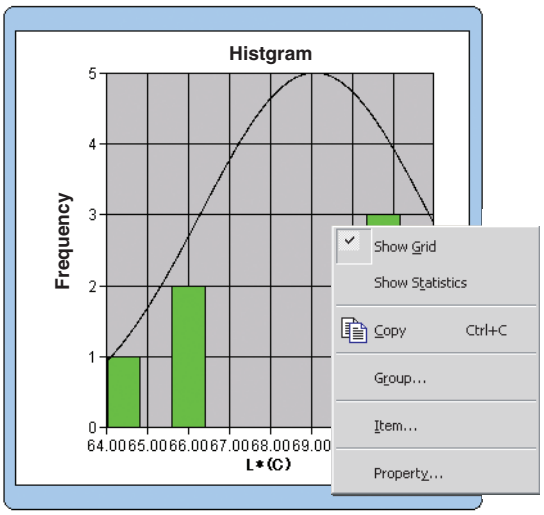


3.8.2 Features

- Plots a trend chart.
- Draws a histogram.
- Draws the normal distribution.
  Shows statistics (average, standard deviation, maximum value, minimum value and range).

3.8.3 Right-click Menu

Right-clicking a graphic object opens a context menu showing the available menu items. Table below shows the menu items displayed for the trend chart/histogram object.



Right-click menu of the trend chart/histogram object

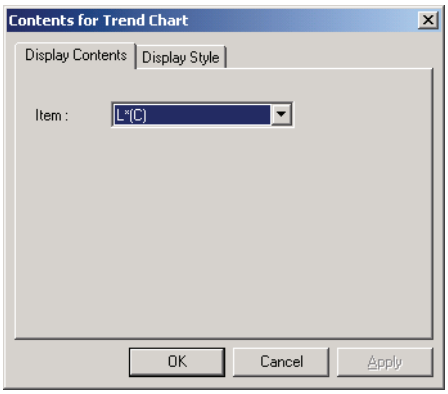
Menu Item	Function
Show Grid	Shows or hides the grid.
Show Statistics	Shows or hides the statistics.
Copy	Copies the graphic object to the clipboard.
Group	Shows a dialog box for specifying the attributes of the data to be plotted.
Item	Shows a dialog box for specifying the target data used for judgement and the display style.
Property	Shows the property dialog box.

See page 287 for the group attribute setting procedure.

3.8.4 Setting Items

Selecting Items from the right-click menu displays a dialog box for specifying the target value to be used for judgement for the trend chart/histogram and the display style.

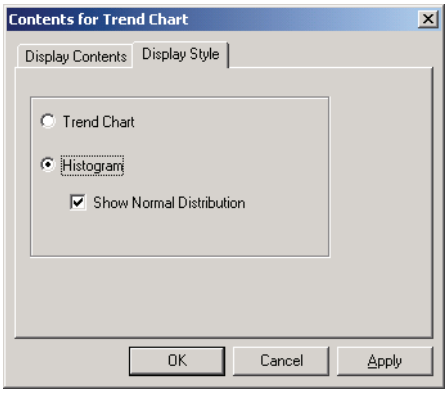
1) Display Contents tab



Item:

Select the colorimetric data used for judgement.

2) Display Style tab



Display Style

Select either Trend Chart or Histogram.
When Histogram is selected, you can specify whether to display normal distribution.

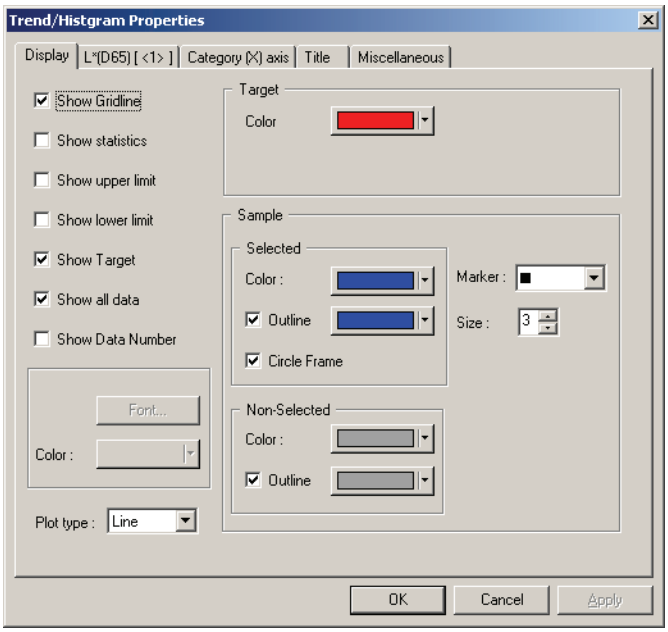
3.8.5 Setting Properties

The following five tabs are available for setting the properties of the trend chart/histogram object.

1) Display
2) Judgement data axis (Example: ΔE)
3) Category axis
4) Title
5) Miscellaneous

The following sections describe the details of these tabs.

1) Display tab



Show Gridline

Select whether to show or hide gridlines.

Show statistics

Select whether to show or hide statistics (average, standard deviation, maximum value, minimum value).

Show upper limit

Select whether to show or hide the upper limit of the tolerance in the trend chart.

Show lower limit

Select whether to show or hide the lower limit of the tolerance in the trend chart.

Show Target

Select whether to show or hide the target data in the trend chart.

Show all data

Select whether or not to show all data when using a line graph in the trend chart.
When not selected, some data including currently selected sample data are displayed.

Show Data Number

Select whether to show or hide the data number shown on the list.

Font Specify the font of the number.
Color Specify the color of the number.

Plot type

Specify a data plot method to be used in the trench chart such as a bar graph or line graph.

Target - Color

Specify a color to indicate the target data.

Sample - Selected - Color

Specify the display color of the sample data currently selected in the trend chart.

Sample - Selected - Outline

Specify the color of the outline of the plot points. When this option is not checked, the color of the outline cannot be specified.

Sample - Selected - Circle Frame

Draw a circle around the plot points of the selected data.

Sample - Non-Selected - Color

Specify the display color of the sample data that is not being selected in the list window.

Sample - Non-Selected - Outline

Specify the color of the outline of the plot points. When this option is not checked, the color of the outline cannot be specified.

Sample - Marker

Specify -●-, -■-, X or — as the line type to indicate the sample data.

Sample - Size

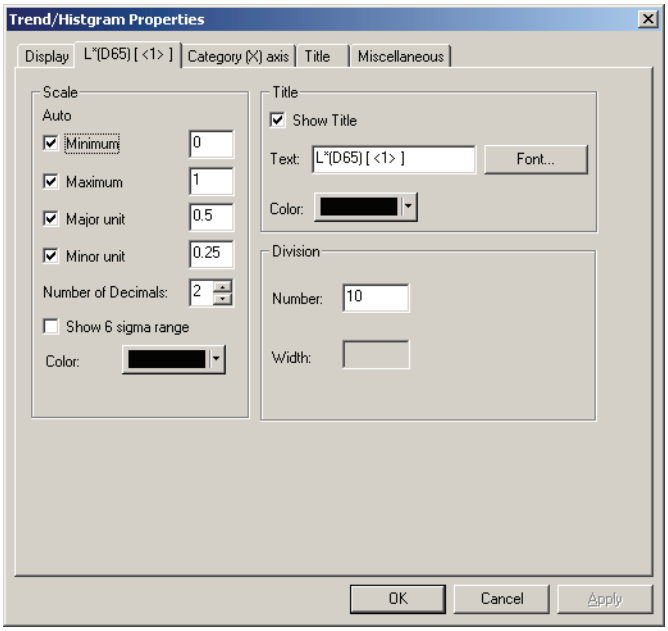
Specify the size (0 to 5) of the marker for plotting the sample data in the trend chart. (When 0 is selected, the marker is not displayed.)

- When the selected list items are absolute values (e.g. L*, a*, b*, X, h, L), the upper and lower limits are not displayed in the trend chart. Even if the option is checked, it is ignored.
- When the selected list items are color difference values (e.g. ΔL*, Δa*, Δb*, ΔX, ΔH*, ΔL), the target data is always 0. Consequently, even when the option is checked, the target data will not be displayed in the trend chart.

See page 154 for the color setting procedure.

2) Judgement data axis tab

Specify the properties of the colorimetric data axis selected in the Display Contents tab in the Item properties. The selected colorimetric data is shown as the name of the tab.



Scale - Auto [Minimum, Maximum, Major unit, Minor unit]

Specify whether to use the automatic setting of the scale for the colorimetric data axis (vertical axis) selected in the Display Contents tab in the Item properties. When Auto is selected, these items are automatically determined according to the minimum and maximum values of the data.

Scale - Value [Minimum, Maximum, Major unit, Minor unit]

Specify the minimum value, maximum value, major unit and minor unit of the scale for the colorimetric data axis selected in the Display Contents tab in the Item properties.

Scale - Number of Decimals

Specify the number of decimal places to be displayed.

Scale - Show 6 sigma range

Enable display of the range between -3σ to +3σ.
* "σ" represents the standard deviation.

Scale - Color

Specify the scale color of the judgement data axis.

Title - Show Title

Select whether to show or hide the title of the axis of the colorimetric data selected in the Display Contents tab in the Item properties.

Title - Text

Specify the colorimetric data selected in the Display Contents tab in the Item properties.

Title - Font

Specify the font to be used for the label appearing on the colorimetric data axis selected in the Display Contents tab in the Item properties. Be sure to also specify the language when specifying the font in the Font dialog box.

Title - Color

Specify the label color of the colorimetric data axis selected in the Display Contents tab in the Item properties.

Division - Number

Specify the number of divisions between the minimum and maximum values used for data sampling in the histogram.

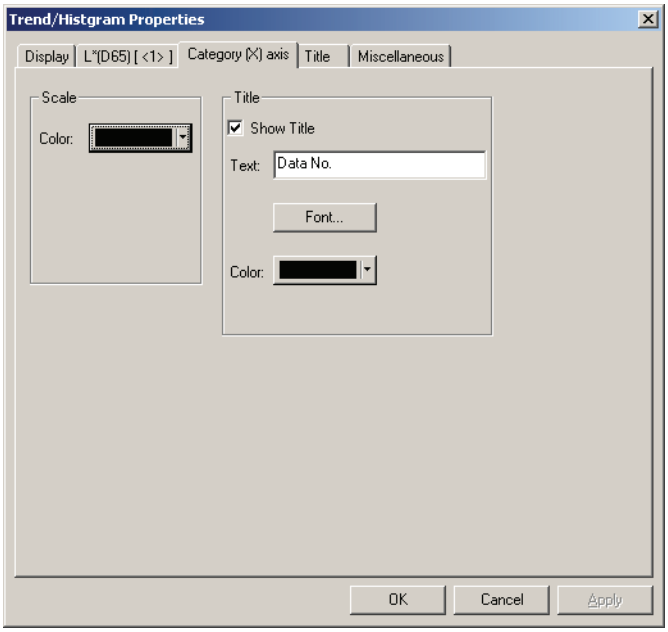
Division - Width [Cannot be edited.]

The width of a division used for data sampling in the histogram is displayed.

See page 154 for the color setting procedure.

3) Category tab

Specify the properties of the data No. and axes to display a trend chart, and specify the properties of the frequency axis to display a histogram.



Scale - Color

Specify the scale color.

Title - Show Title

Select whether to show or hide the label title.

Title - Text

Specify the label text.

Title - Font

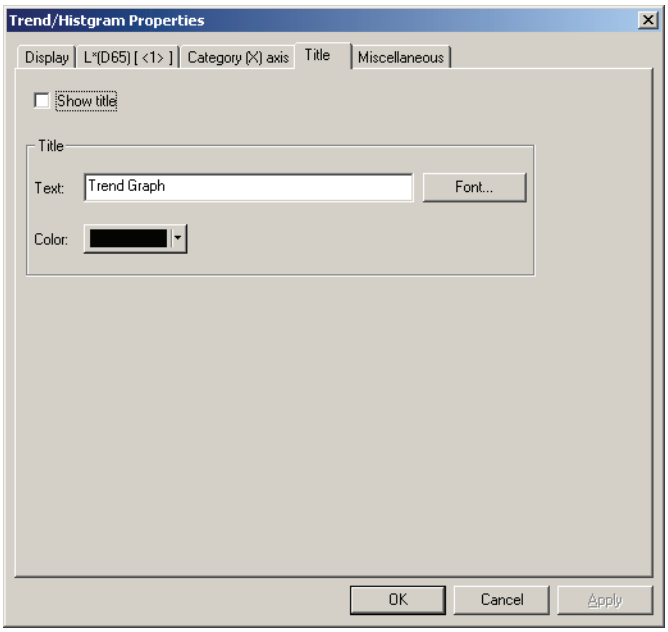
Specify the font to be used for the label text. Be sure to also specify the language when specifying the font in the Font dialog box.

Title - Color

Specify the label color.

See page 154 for the color setting procedure.

4) Title tab



Show title

Select whether to show or hide the title of the chart.

Title - Text

Specify the text for the chart title.

Title - Font

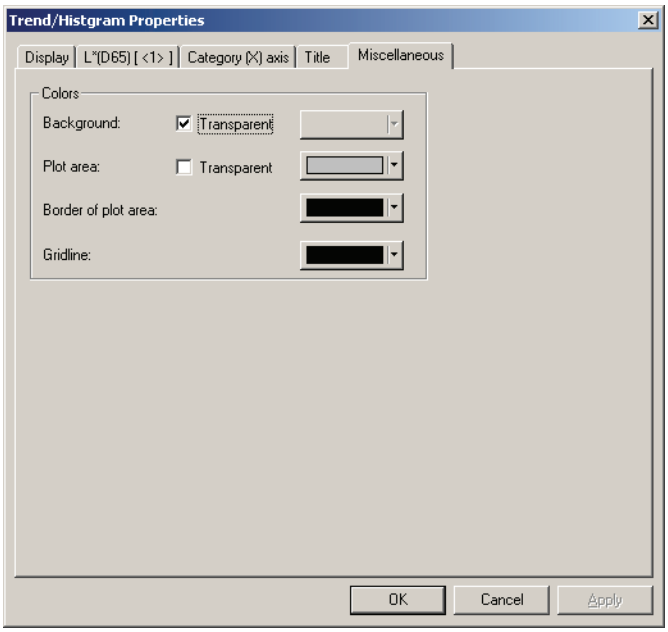
Specify the font to be used for the chart title. Be sure to also specify the language when specifying the font in the Font dialog box.

Title - Color

Specify the color of the chart title.

See page 154 for the color setting procedure.

5) Miscellaneous tab



Colors - Background

Specify the background color of the graphic object.

Transparent When this option is checked, the background is transparent.

Colors - Plot area

Specify the color to be used for the inside of the chart.

Transparent When this option is checked, the inside of the graph is transparent.

Colors - Border of plot area

Specify the border color of the chart.

Colors - Gridline

Specify the gridline color of the chart.

See page 154 for the color setting procedure.

3.9 Image Object

3.9.1 Overview

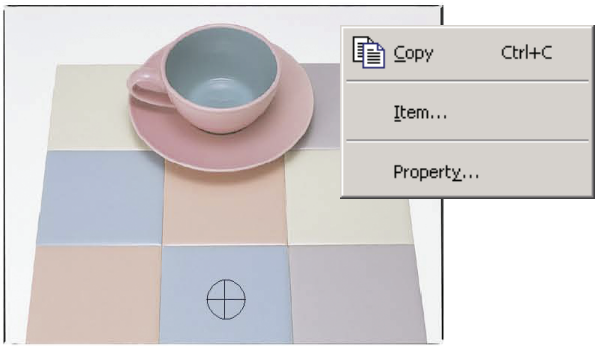
The image object is used to view an image file in JPEG or BMP format. The measurement spot can be marked on the image object. (See Fig. 6.)

3.9.2 Features

- Displays a specified image (JPEG or BMP format).
- Shows a marker at a measurement spot.
- Graphs can be copied.

3.9.3 Right-click Menu

Right-clicking a graphic object opens a context menu showing the available menu items. Table below shows the menu items displayed for the image object.



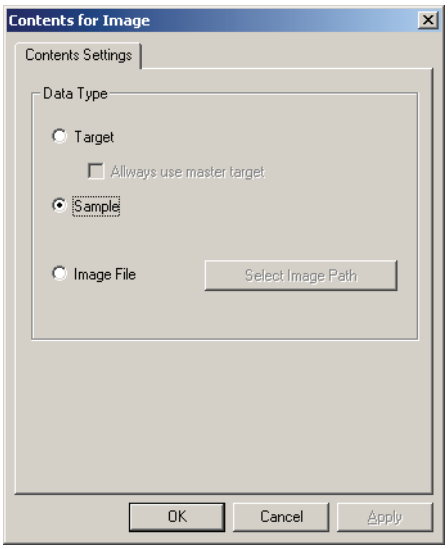
Right-click menu of image object

Menu Item	Function
Copy	Copies the graphic object to the clipboard.
Item	Shows a dialog box for specifying the data to be displayed.
Property	Shows the property dialog box.

3.9.4 Setting Items

Selecting Items from the right-click menu displays a dialog box for specifying the type of the data to be displayed.

1) Content Settings tab



Data Type

Select whether to display the target data or sample data.

Target

Display an image linked to the target data

Always use master target

Select whether to always show or hide the master target when the target is displayed.

Sample

Display an image linked to the sample data

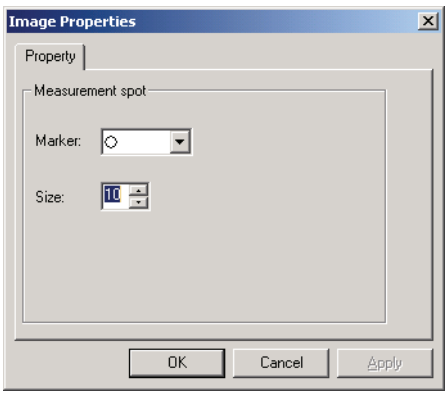
Image File

Display an image specified by selecting the Select Image Path button.

3.9.5 Setting Properties

Selecting Property from the right-click menu displays a dialog box for specifying the properties. The following tab is available for setting the properties of the image object.

1) Property tab



Measurement spot - Marker

Specify ×, ○ or ⊕ as the marker type.

Measurement spot - Size

Specify the size of the marker.

3.10 Numeric Label Object

3.10.1 Overview

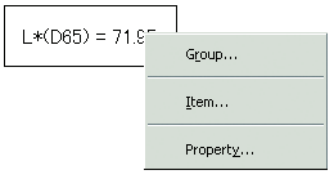
The numeric label object is used to show colorimetric data or judgement items such as “Pass/Fail.” When L* is selected as the data to be shown, for example, the object is displayed as shown in Fig. 7.

3.10.2 Features

- Displays colorimetric data.
- Displays judgement items (such as “Pass/Fail”).
- Shows tolerance

3.10.3 Right-click Menu

Right-clicking a numeric label object opens a context menu showing the available menu items. Table below shows the menu items displayed for the numeric label object.



Right-click menu of numeric label object

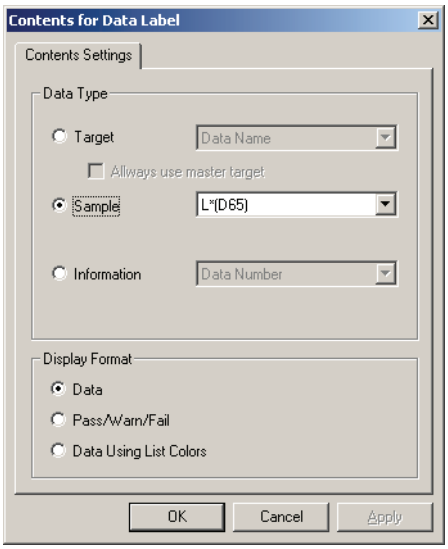
Menu Item	Function
Group	Shows a dialog box for specifying the attributes of the data to be plotted.
Item	Shows a dialog box for specifying the data to be displayed.
Property	Shows the property dialog box.

See page 287 for the group attribute setting procedure.

3.10.4 Setting Items

Selecting Items from the right-click menu displays a dialog box for specifying the type and format of the data to be displayed.

1) Content Settings tab



Data Type

Select whether to display the target data or sample data and choose the contents of the selected data.

Always use master target

Select whether to always show or hide the master target when the target is displayed.

Information

Use the combo box to specify the value to be displayed. Selectable items are: Data Number, Observer, Primary, Secondary, Tertiary and Software Version.

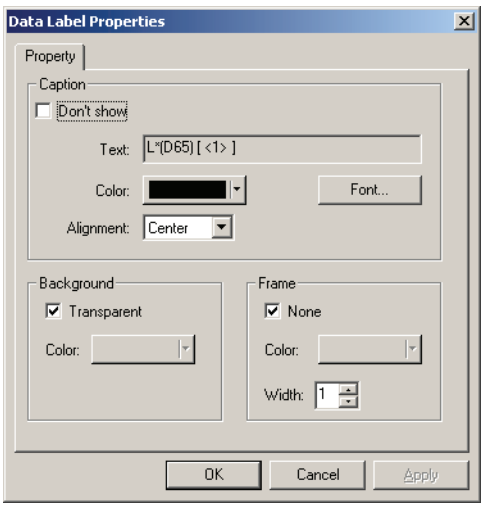
Display Format (This option is displayed when Sample is selected for Data Type.)

Select the format of the display items when sample data is selected for Data Type.
Selectable item: Numeric value, assessment (result of the pass/fail judgement).
When Data Using List Colors is selected, the data is displayed using the character color specified on the Judgement tab displayed by selecting Data - Judgement Format from the menu bar.

3.10.5 Setting Properties

Selecting Property from the right-click menu displays a dialog box for specifying the properties. The following tab is available for setting the properties of the numeric label object.

1) Property tab



Caption - Don't show

Select whether to show or hide the caption text.

Caption - Text [Cannot be edited.]

The text describing the data is displayed.

Caption - Color

Specify the color of the text.
When Data Using List Colors is selected for Display Format, this color setting will be invalid when other sample data is selected.

Caption - Font

Specify the font to be used for the text. Be sure to also specify the language when specifying the font in the Font dialog box.

Caption - Alignment

Specify Left, Center, or Right for the alignment of the text within the label.

Background - Transparent

Specify whether to fill in the background. When pseudo color is selected as the data to be displayed, selecting fill the background fills the background of the label with the pseudo color.

Background - Color

Specify the background color of the label.
When Data Using List Colors is selected for Display Format, this color setting will be invalid when other sample data is selected.
When pseudo color is selected as the data to be displayed, the background is filled with the pseudo color. Even if the background color is changed here, the setting will return to the pseudo color.

Frame - None

Select whether to draw a frame around the label.

Frame - Color

Specify a color for the frame around the label.

Frame - Width

Specify the width of the frame around the label.

See page 154 for the color setting procedure.

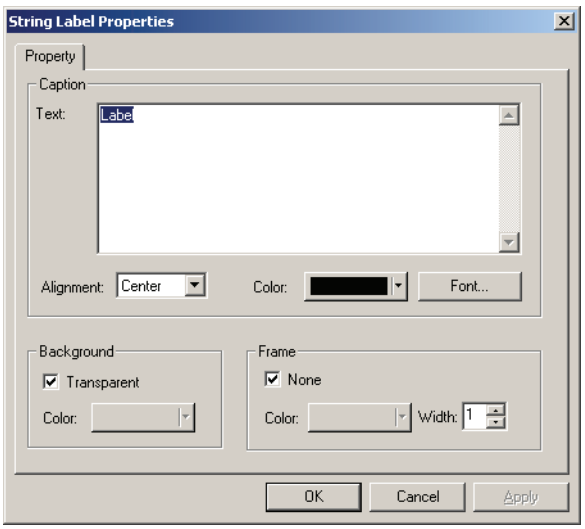
3.11 String Label Object

The string (text) label object is used to show the name of the data to be displayed.

3.11.1 Setting Properties

Selecting Property from the right-click menu displays a dialog box for specifying the properties. The following tab is available for setting the properties of the string label object.

1) Property tab



Caption - Text

Type the name of the data to be displayed.

Caption - Alignment

Specify Left, Center or Right for the alignment of the text within the label.

Caption - Color

Specify the color of the text.

Caption - Font

Specify the font to be used for the text. Be sure to also specify the language when specifying the font in the Font dialog box.

Background - Transparent

Specify whether to fill in the background.

Background - Color

Specify the background color of the label.

Frame - None

Select whether to draw a frame around the label.

Frame - Color

Specify a color for the frame around the label.

Frame - Width

Specify the width of the frame around the label.

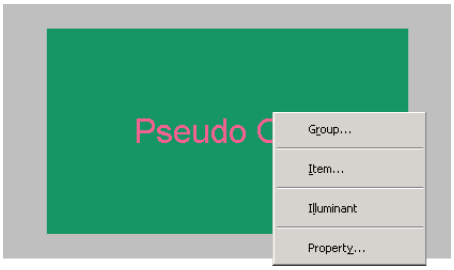
See page 154 for the color setting procedure.

3.12 Pseudo Color Object

The pseudo color object is used to show a pseudo color. A pseudo color is the visualized colorimetric value of a sample or target data.

3.12.1 Right-click Menu

Right-clicking a pseudo color object opens a context menu showing the available menu items. Table below shows the menu items displayed for the pseudo color object.



Right-click menu of Pseudo color object

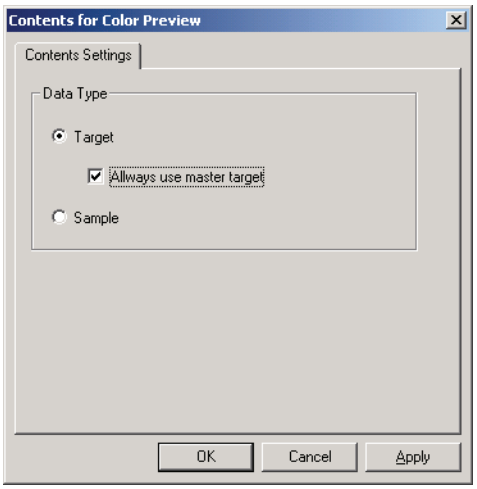
Menu Item	Function
Group	Shows a dialog box for specifying the attributes of the data to be plotted.
Item	Shows a dialog box for specifying the data to be displayed.
Illuminant	Shows the Illuminant settings dialog box.
Property	Shows the property dialog box.

See page 287 for the group attribute setting procedure.

3.12.2 Setting Items

Selecting Items from the right-click menu displays a dialog box for specifying the type of the data to be displayed.

1) Content Settings tab



Data Type

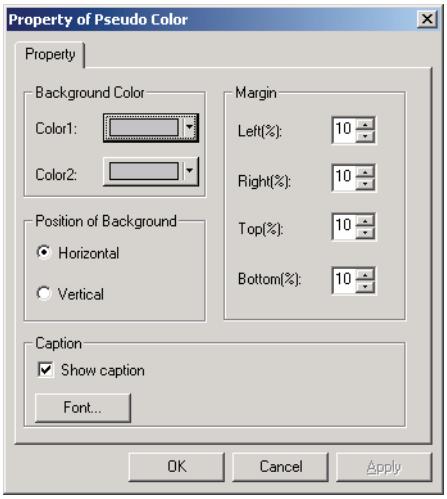
Select whether to display the target data or sample data.

Always use master target

Select whether to always show or hide the master target when the target is displayed.

3.12.3 Setting Properties

Selecting Property from the right-click menu displays a dialog box for specifying the properties. This dialog box has a single tab as shown below.



Background Color - Color1

Specify the background color shown on the left of or above the object.

Background Color - Color2

Specify the background color shown on the right of or below the object.

Position of Background

Select either of Horizontal or Vertical.
When Horizontal is selected, the colors specified with Color1 and Color2 are displayed on the right and left of the object. When Vertical is selected, the colors specified with Color1 and Color2 are displayed above and below the object.

Caption - Show Caption

Select whether to display a caption.

Caption - Font

Specify the font used for the text.
When selecting a font name in the Font dialog box, be sure to also select a font type.
Japanese characters may not display properly if the selected type is not a Japanese font.

Margin

Specify the top, bottom, right, and left margin widths of the pseudo color display.

3.13 Line Graph Object

3.13.1 Overview

The line graph object is used to judge data between different attributes. The group attributes are plotted on the horizontal axis, and the colorimetric data is plotted on the vertical axis.

When the CM-512m3A is connected as an instrument, data for 25°, 45°, and 75° are displayed with a line.

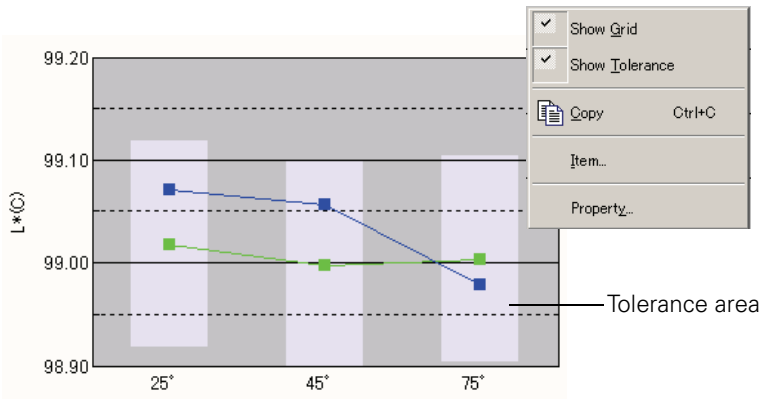
3.13.2 Features

- Shows data with two or more attributes
- Shows the tolerance of each attribute

3.13.3 Right-click Menu

Right-clicking a graphic object opens a context menu showing the available menu items.

Table below shows the menu items displayed for the line graph object.

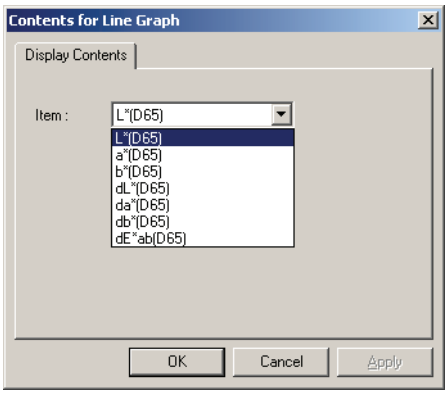


Right-click menu of line graph object

Menu Item	Function
Show/Hide Grid	Shows or hides the grid.
Show/Hide Tolerance	Shows or hides the tolerances
Copy	Copies the graphic object to the clipboard
Item	Shows a dialog box for specifying a data item to be judged.
Property	Shows the property dialog box

3.13.4 Setting Items

When Item is selected from the right-click menu, a dialog box appears for specifying the type of data to be displayed.



Item

Select colorimetric data to be judged.
Available item: The colorimetric data selected in the list items

3.13.5 Setting Properties

Selecting Property from the right-click menu displays a dialog box for specifying the properties of the graph.
The following five tabs are available for setting the properties of the line graph object.

1) Display

2) Judgement data axis (Example: ΔL*)

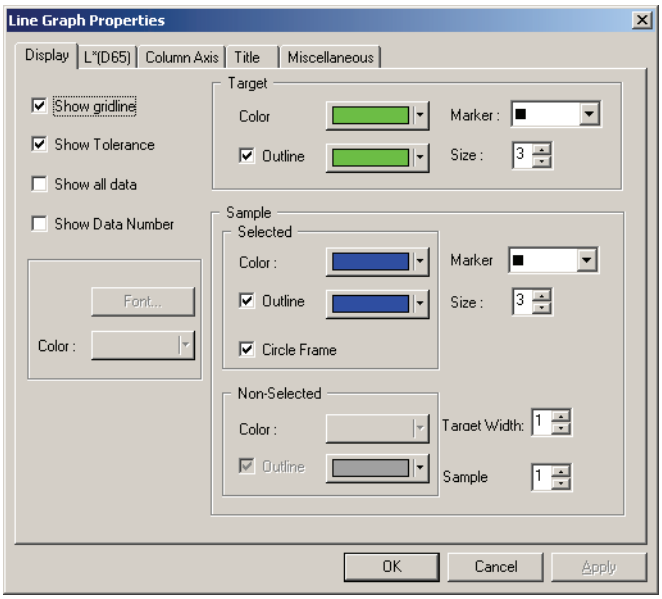
3) Column Axis

4) Title

5) Miscellaneous

The following sections describe the details of these tabs.

1) Display tab



Show gridline

Select whether to show or hide gridlines.

Show Tolerances

Select whether to show or hide the tolerances.

Show all data

Select whether to show or hide all the data.

Show Data Number

Select whether to show or hide the data number shown on the list.

Font Specify the font of the number.
Color Specify the color of the number.

Target - Color

Specify the display color of the target data.

Target - Outline

Specify the color of the outline of the plot points. When this option is not checked, the color of the outline cannot be specified.

Target - Marker

Specify -●-, -■-, X or — as the line type to indicate the target data.

Target - Size

Specify the size of the plot points.

Sample - Selected - Color

Specify the display color of the sample data being selected in the list window.

Sample - Selected - Outline

Specify the color of the outline of the plot points. When this option is not checked, the color of the outline cannot be specified.

Sample - Selected - Circle Frame

Draw a circle around the plot points of the selected data.

Sample - Non-Selected - Color

Specify the display color of the sample data that is not being selected in the list window.

Sample - Non-Selected - Outline

Specify the color of the outline of the plot points. When this option is not checked, the color of the outline cannot be specified.

Sample - Marker

Specify -●-, -■-, X or — as the line type to indicate the sample data.

Sample - Size

Specify the size (0 to 5) of the plot points.

Sample - Target Width

Specify the line width (1 to 5) of the target data.

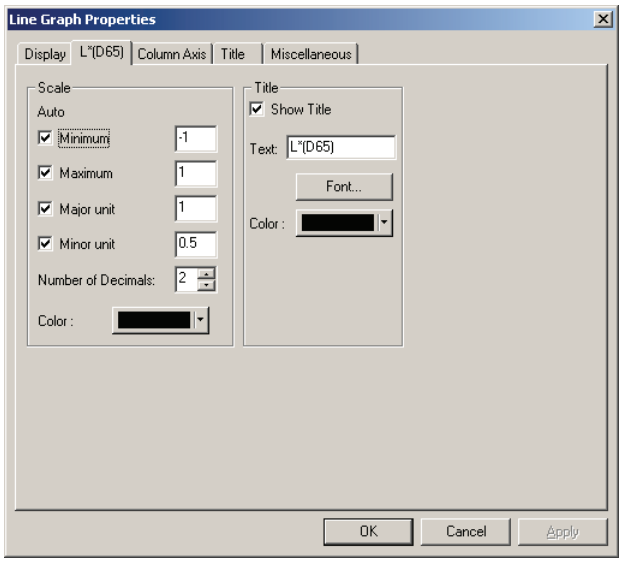
Sample - Sample

Specify the line width (1 to 5) of the sample data.

See page 154 for the color setting procedure.

2) Judgement data axis (Example: ΔL*) tab

Specify the properties of the colorimetric data axis selected with Item.
The selected colorimetric data is shown as the name of the tab.



Scale - Auto [Minimum, Maximum, Major unit, Minor unit]

Specify whether to use the automatic setting of the scale for the colorimetric data axis (vertical axis) selected in the Display Contents tab in the Item properties. When Auto is selected, these items are automatically determined according to the minimum and maximum values of the data.

Scale - Value [Minimum, Maximum, Major unit, Minor unit]

Specify the minimum value, maximum value, major unit and minor unit of the scale for the colorimetric data axis selected in the Display Contents tab in the Item properties.

Scale - Number of Decimals

Specify the number of decimal places to be displayed.

Scale - Color

Specify the scale color of the judgement data axis.

Title - Show Title

Select whether to show or hide the title of the axis of the colorimetric data selected in the Display Contents tab in the Item properties.

Title - Text

Specify the label name of the axis of the colorimetric data selected in the Display Contents tab in the Item properties.

Title - Font

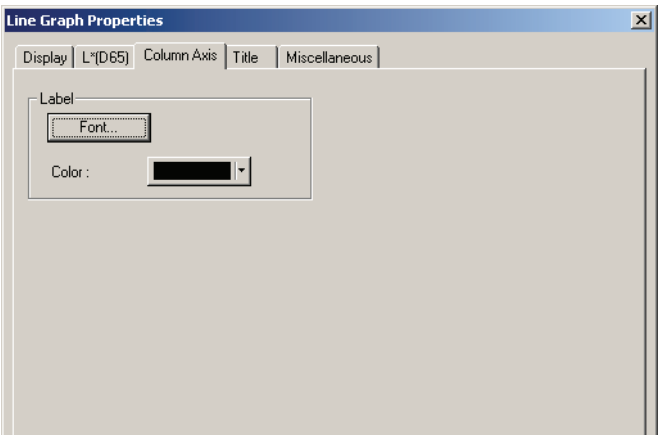
Specify the font to be used for the label appearing on the colorimetric data axis selected in the Display Contents tab in the Item properties. Be sure to also specify the language when specifying the font in the Font dialog box.

Title - Color

Specify the label color of the colorimetric data axis selected in the Display Contents tab in the Item properties.

See page 154 for the color setting procedure.

3) Column Axis (attribute) tab



Label - Font

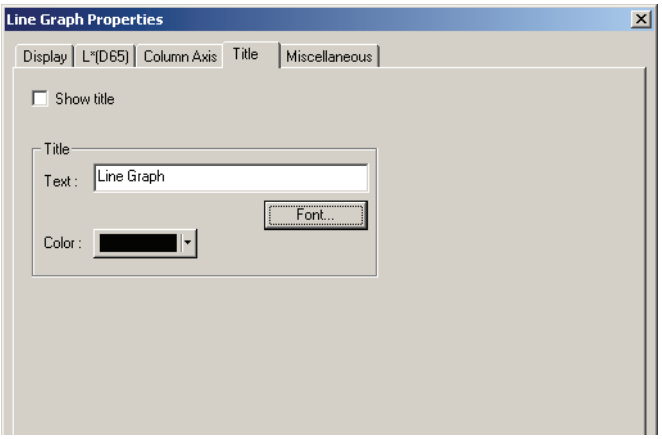
Specify the font to be used for the label text. Be sure to also specify the language when specifying the font in the Font dialog box.

Label - Color

Specify the label color.

See page 154 for the color setting procedure.

4) Title tab



Show title

Select whether to show or hide the title of the graph.

Title - Text

Specify the text for the graph title.

Title - Font

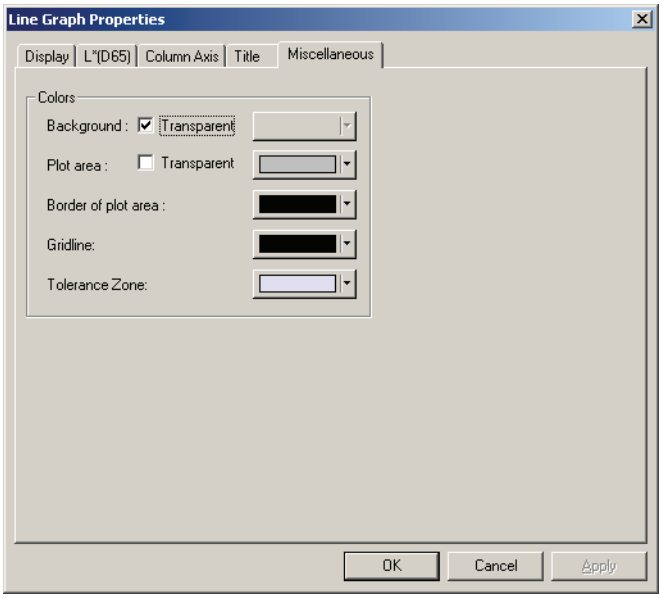
Specify the font to be used for the graph title. Be sure to also specify the language when specifying the font in the Font dialog box.

Title - Color

Specify the color of the graph title.

See page 154 for the color setting procedure.

5) Miscellaneous tab



Colors - Background

Specify the background color of the graphic object.
Transparent When this option is checked, the background is transparent.

Colors - Plot area

Specify the color to be used for the inside of the graph.
Transparent When this option is checked, the inside of the graph is transparent.

Colors - Border of plot area

Specify the border color of the graph.

Colors - Gridline

Specify the gridline color of the graph.

Color - Tolerance Zone

Specify the color of the tolerance area.

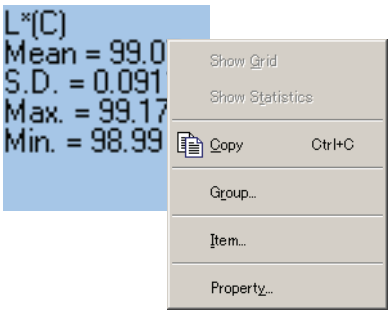
See page 154 for the color setting procedure.

3.14 Statistic Object

The statistic object is used to view the average, the standard deviation, the maximum and minimum, and range values of specified colorimetric data.
The standard deviation is calculated based on unbiased variance.

3.14.1 Right-click Menu

Right-clicking a graphic object opens a context menu showing the available menu items.
Table below shows the menu items displayed for the statistic object.

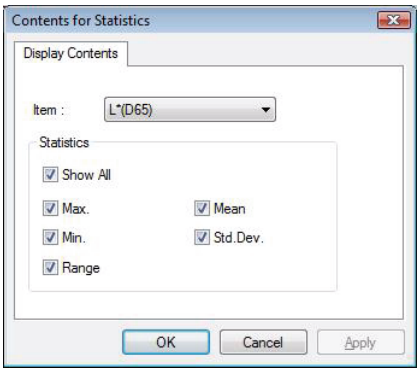


Right-click menu of statistic object

Menu Item	Function
Copy	Copies the graphic object to the clipboard
Group	Shows a dialog box for specifying the attributes of the data
Item	Shows a dialog box for specifying data items to be judged
Property	Shows the property dialog box

3.14.2 Setting Items

When Item is selected from the right-click menu, a dialog box appears for specifying colorimetric data to be judged with a statistical object.



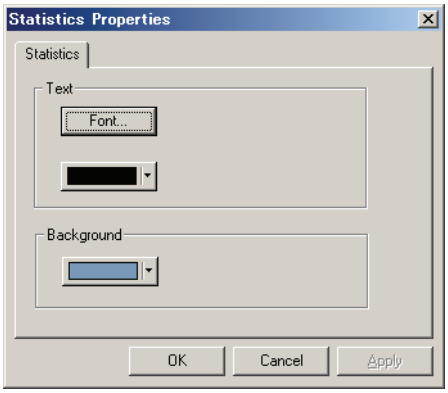
Item

Select colorimetric data to be judged.
Available item: The colorimetric data selected in the list items

3.14.3 Setting Properties

Selecting Property from the right-click menu displays a dialog box for specifying the properties.
The following tab is available for setting the properties of the statistic object.

1) Statistic tab



Text - Font

Specify the font of the character string to be displayed.

Text - Color

Specify the color of the character string.

Background - Color

Specify the background color of the graphic object.

See page 154 for the color setting procedure.

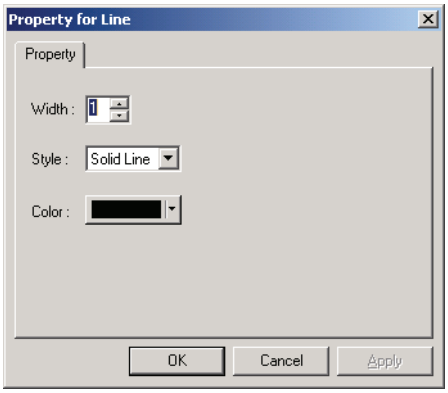
3.15 Line Object

The line object is used to draw lines.

3.15.1 Setting Properties

Selecting Property from the right-click menu displays a dialog box for specifying the properties. The following tab is available for setting the properties of the line object.

1) Property tab



Width

Specify the width of the line.

Style

Select Solid Line, Dashed Line or Dotted Line as the line style.

Color

Specify the color of the line.

See page 154 for the color setting procedure.

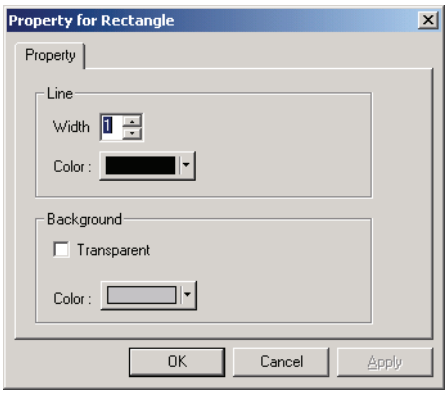
3.16 Rectangle Object

The rectangle object is used to draw rectangles.

3.16.1 Setting Properties

Selecting Property from the right-click menu displays a dialog box for specifying the properties. The following tab is available for setting the properties of the rectangle object.

1) Property tab



Line - Width

Specify the width of the frame.

Line - Color

Specify the color of the frame.

Background - Transparent

Specify whether to fill in the background.

Background - Color

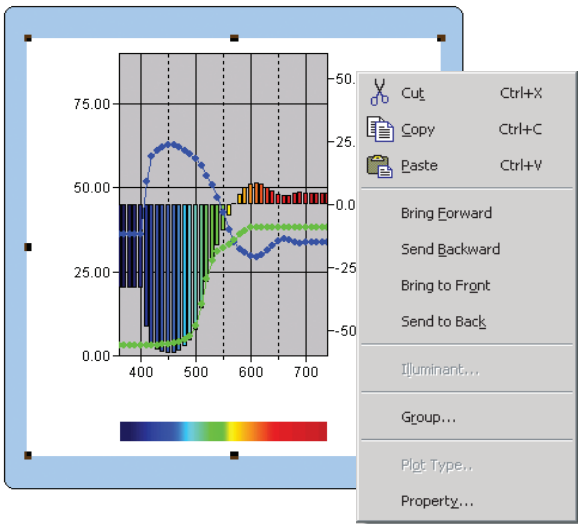
Specify the background color.

See page 154 for the color setting procedure.

3.17 Operation of the Canvas Window in Edit Mode

3.17.1 Right-click Menu

Table below lists the right-click menu displayed for each graphic object to edit screens (to place graphic objects) in the canvas window.



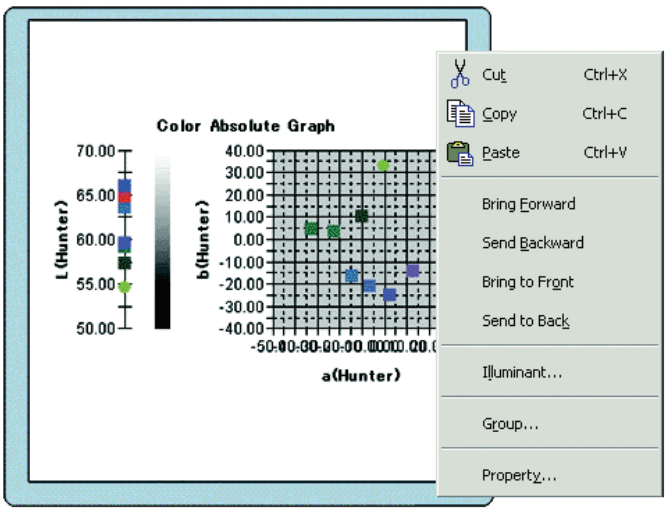
Right-click menu used for editing graphic objects

Menu Item	Function
Cut*	Cuts the graphic object.
Copy*	Copies the graphic object.
Paste*	Pastes the graphic object.
Bring Forward*	Brings the graphic object forward.
Send Backward*	Sends the graphic object backward.
Bring to Front*	Brings the graphic object to the front.
Send to Back*	Sends the graphic object to the back.
Illuminant	Shows a dialog box for specifying the illuminant.
Group	Shows a dialog box for specifying the group.
Plot Type	Shows the plot type dialog box. (Only for the absolute graph or color difference graph).
Property	Shows the property dialog box.

The menu items marked with an asterisk can be selected from *Edit* in the menu bar.

3.17.2 Illuminant Setting

You can change the illuminant for the absolute graph (L*a*b*, HunterLab) object, color difference graph (ΔL*Δa*Δb*, ΔLΔaΔb) object, 3D graph (ΔL*Δa*Δb*) object and pseudo color object. You can also display data by using several illuminants for the absolute graph (L*a*b*, HunterLab) object, color difference (ΔL*Δa*Δb*, ΔLΔaΔb) object and 3D graph (ΔL*Δa*Δb*) object.

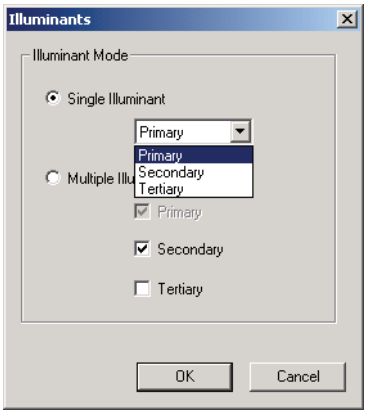


Illuminant Mode - Single Illuminant

Select Primary, Secondary or Tertiary as the illuminant.

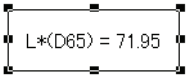
Illuminant Mode - Multiple Illuminants

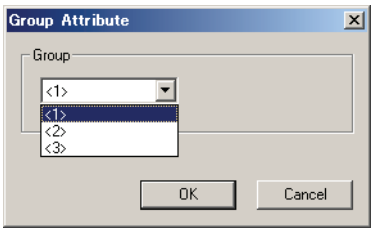
Specify an illuminant to be used other than the primary illuminant.



3.17.3 Group Setting

If the number of banks is set to 2 or more, the group attribute of the displayed data must be specified. Select either SCI or SCE for the spectral graph, absolute graph, color difference graph, 3D graph, two-axis graph, trend chart or numeric label objects. Select a group trait to draw data of any of 25 degree, 45 degree or 75 degree.





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