

**HIOKI**

Instruction Manual

# **TM6101 Utility**

**EN**

## Contents

<b>Chapter 1 Overview .....</b>	<b>3</b>
Getting Ready to Use the TM6101 Utility .....	3
Registered Trademarks.....	3
Conventions Used in This Manual.....	3
Mouse Operation .....	3
Screen Font Size .....	3
<b>Chapter 2 Using the Software .....</b>	<b>5</b>
2.1 Launching the Software .....	5
2.2 Interface Element Names .....	5
2.3 Window Displays .....	6
2.4 Verifying the Connection.....	6
2.5 Configuring Settings .....	7
Saving Settings to a File .....	9
Loading Settings from a File .....	9
Resetting Settings .....	9
2.6 Using Correction Functions .....	10
Performing Dark Correction .....	10
Performing Chromaticity Correction .....	11
Performing Illuminance Correction .....	12
Performing Luminous Flux Correction.....	13
Performing Luminous Intensity Correction .....	13
Saving correction values .....	14
Loading correction values .....	14
2.7 Taking Measurements .....	15
Starting and Stopping Measurement .....	16
Changing Measurement Items and the Graph Display .....	16
Changing the Text Style for Measurement Results .....	17
Saving Measurement Results for Individual Measurements to a CSV File .....	17
Saving the Currently Displayed Measurement Results to a CSV File .....	18
Saving the measurement screen as an image file.....	18
To Copy the Currently Displayed Measurement Results to the Clipboard.....	19
Configuring File Save and Display Settings .....	20
CSV Files .....	21
About the xy chromaticity diagram.....	22
2.8 Rank Detection Function.....	23
Registering a rank .....	23

Displaying rank detection results .....	25
2.9 Judgment Function .....	26
Configuring the Judgment Process .....	26
Displaying judgment results .....	31
Chapter 3 Menu Commands .....	33
Chapter 4 List of Messages .....	35
4.1 Measured Values.....	35
4.2 Status Bar .....	35
4.3 Messages.....	36

## Chapter 1 Overview

The TM6101 Utility application software is specifically designed for use with the TM6101 LED Optical Meter. It allows you to control the TM6101 and view its measurement results. For more information about more sophisticated control and development of user-specific programs, see the TM6101 Measuring Library Instruction Manual.

### Getting Ready to Use the TM6101 Utility

For more information about what you need to do to prepare to use the TM6101 Utility, see the TM6101 LED Optical Meter Instruction Manual.

### Registered Trademarks

- Adobe and Reader are registered trademarks or trademarks of Adobe Systems Incorporated in the United States and other countries.
- Microsoft, Windows, and Excel are registered trademarks of Microsoft Corporation.

### Conventions Used in This Manual

- Windows dialog boxes are referred to as “dialog boxes.”
- Menu names, commands, dialog box titles, the names of buttons and other interface elements on dialog boxes, and keys are enclosed in parentheses.

### Mouse Operation

- Click: Press and quickly release the left button of the mouse.
- Right-click: Press and quickly release the right button of the mouse.
- Double-click: Quickly click the left button of the mouse twice.
- Drag: While holding down the left button of the mouse, move the mouse and then release the left button at the desired location.
- Activate: Click on a window on the screen to activate that window.

### Screen Font Size

The TM6101 Utility does not support high-DPI displays. Use of high-DPI display mode will prevent the screen layout from being displayed properly. The following DPI settings should be used:

Windows 7

Open [Control Panel]-[Appearance and Personalization]-[Display]-[Set Custom Text Size (DPI)] and change it to “96 pixels per inch”

## Windows 10

Open [System]-[Display] and change [Change the size of text, apps, and other items] to “100% (Recommended)”

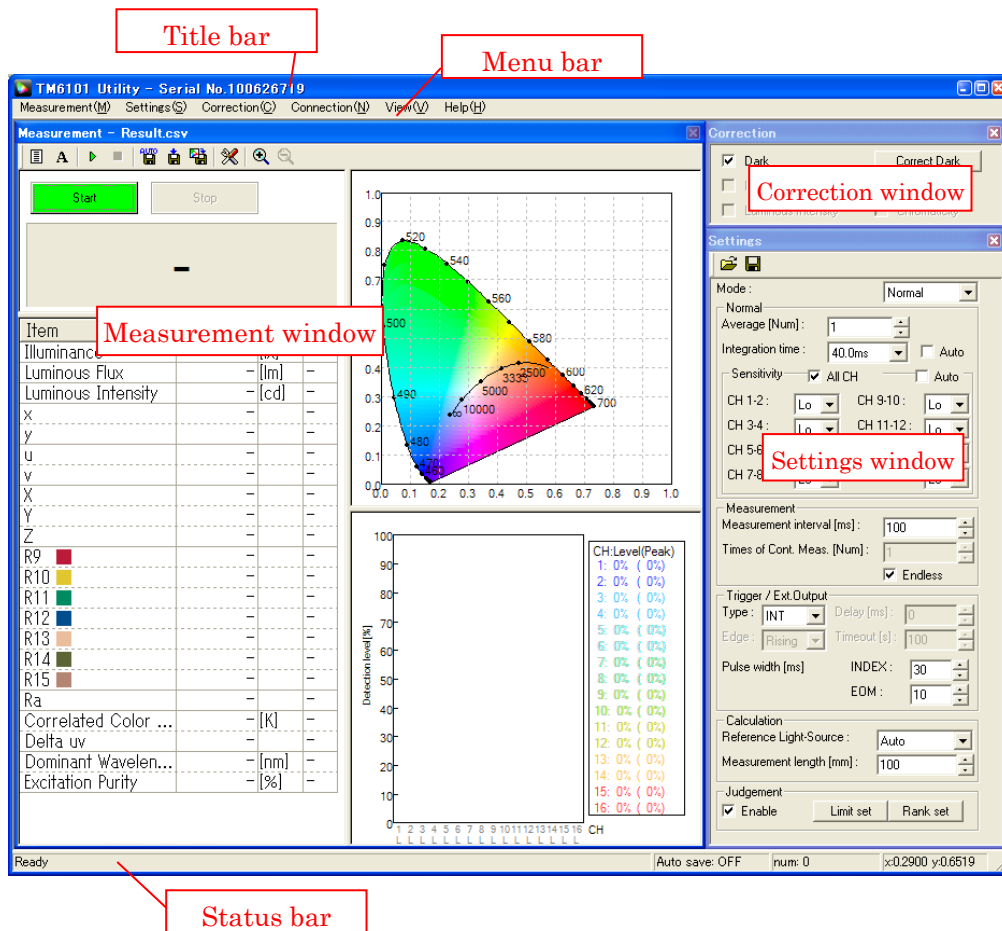
## Chapter 2 Using the Software

### 2.1 Launching the Software

Select [Programs]-[HIOKI]-[TM6101]-[TM6101 Utility] from the [Start] menu to launch the application. (If the software has not been installed, refer to “2.2 Installing the Software” in the TM6101 LED Optical Meter Instruction Manual for a description of how to do so.)

### 2.2 Interface Element Names

The software consists of the following interface elements:



The status bar displays the following information:

- Auto save ON/OFF (see “2.7 Taking Measurements”)
- Current measurement count
- Chromaticity coordinates at the mouse pointer position (when the mouse pointer is located at a chromaticity coordinate)

## 2.3 Window Displays

The display of the correction and settings windows can be toggled on and off.

To display the windows:

Click [Correction] or [Settings] on the [View] menu to check the desired elements.

To hide the windows:

Click [Correction] or [Settings] on the [View] menu to uncheck the desired elements.

The windows can also be hidden by clicking their [X] (Close) buttons.

## 2.4 Verifying the Connection

Verify that the status bar shows [Ready]. The serial number of the currently connected TM6101 should be shown on the title bar. If the status bar does not indicate [Ready], check the connection with the TM6101.

The TM6101 Utility automatically connects to the instrument when it is launched, but you can also connect at any time after launching the software by clicking [Open Device] on the [Connection] menu. Similarly, you can disconnect the instrument by clicking [Close Device] on the [Connection] menu.

### **Note**

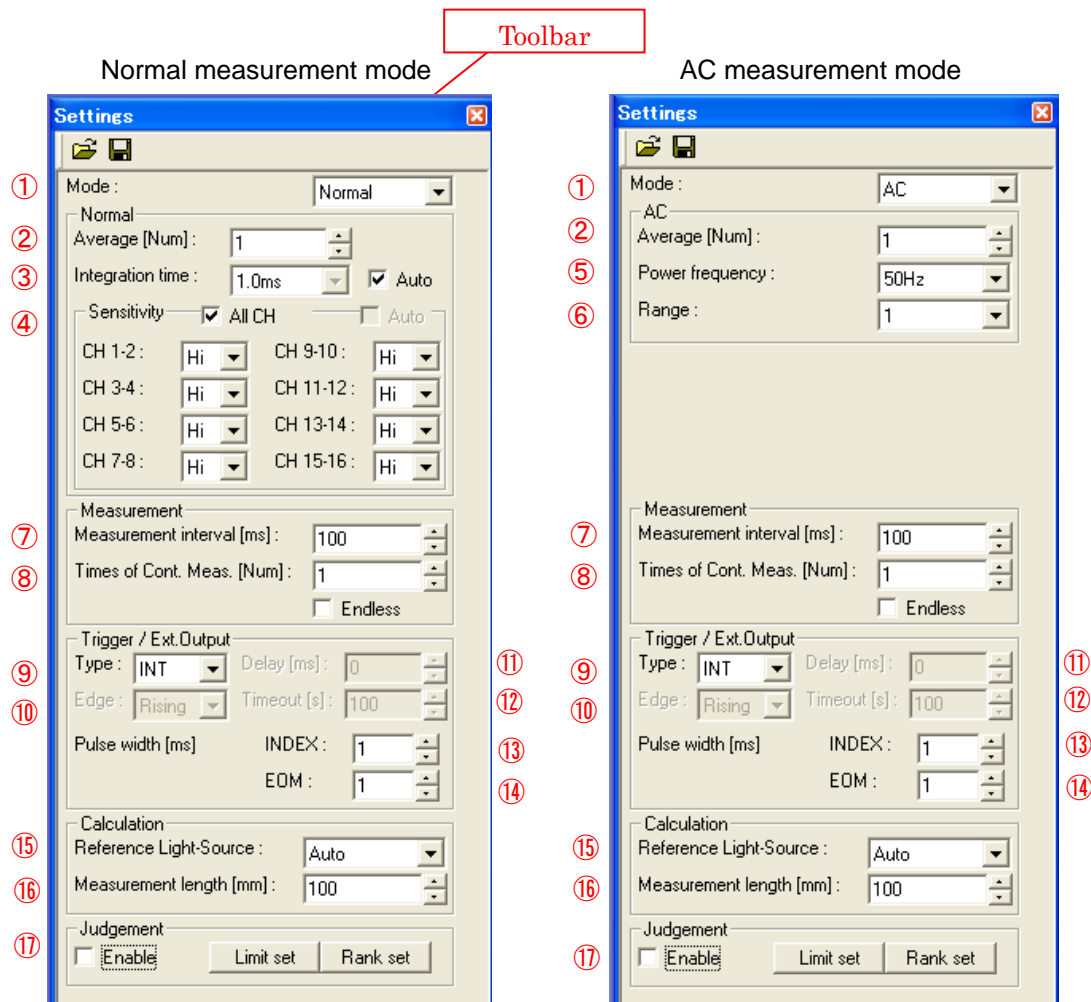
If the driver software has not been installed, refer to “2.2 Installing the Software” in the TM6101 LED Optical Meter Instruction Manual for a description of how to do so.

### **Note**

The TM6101 Utility can only be used with one TM6101 at a time. If you wish to connect and use multiple instruments simultaneously, please use the library software.

## 2.5 Configuring Settings

Settings are configured on the [Settings] window (for more information about settings, see “2.7 Configuring the Instrument for Measurement” in the TM6101 LED Optical Meter Instruction Manual).



- ① Sets the measurement mode ([Normal]: Normal measurement mode; [AC]: AC measurement mode).
- ② Sets the average times.  
Sets the number of readings averaged internally for one measurement.
- ③ Configures the integration time setting.  
Setting auto-ranging: Selecting the [Auto] checkbox displays the current range.  
The integration time and sensitivity range cannot be set to auto-range operation at the same time. Auto-ranging cannot be used when using the external trigger setting.
- ④ Sets the sensitivity range ([Lo], [Hi]).  
Setting auto-ranging: Selecting the [Auto] checkbox displays the current range.  
Setting all channels to the same setting: Select the [All Ch] checkbox.  
The integration time and sensitivity range cannot be set to auto-range operation at the same



time.

Auto-ranging cannot be used when using the external trigger setting.


- ⑤ Sets the power supply frequency for AC power ([50Hz], [60Hz]).
- ⑥ Sets the measurement range ([1], [2], [3]).
- ⑦ Sets the measurement interval time (internal trigger only).  
When the interval time is shorter than the measurement time, the instrument will be unable to take measurements at the set interval. Set the interval time so that it is longer than the measurement time.
- ⑧ Sets the times of continuous measurement (internal trigger only).  
Setting the times of continuous measurement to an unlimited number: Select the [Endless] checkbox.
- ⑨ Sets the trigger ([INT]: Internal trigger; [EXT]: External trigger).
- ⑩ Sets the trigger polarity (external trigger only) ([Rising]: Rising edge; [Falling]: Falling edge).
- ⑪ Sets the trigger delay (external trigger only).
- ⑫ Sets the trigger timeout (external trigger only). If trigger input is not received within the set period of time, trigger monitoring will be canceled.
- ⑬ Sets the external control index output pulse width.
- ⑭ Sets the minimum pulse width for external control EOM output. EOM output is generated when the judgment function is on. EOM output is held until INDEX output turns off. The actual EOM output time will be longer than the set pulse width.
- ⑮ Sets the reference light source to use for color rendering index evaluation.  
([Daylight-CIE]: CIE daylight; [Black-Body]: Blackbody radiation; [Auto]: Automatically selected with 5,000K as a boundary)
- ⑯ Sets the measurement length for luminous intensity measurement (only when the luminous intensity display is present).
- ⑰ Configures the judgment function and rank detection function (see “2.8 Rank Detection Function” and “2.9 Judgment Function”).

⑨⑩⑪⑬⑭⇒For more information about external control, see “Chapter 4 External Control” in the TM6101 LED Optical Meter Instruction Manual.

**Note**

When auto-ranging is enabled, the next range will be selected automatically when the detection level falls to less than 10% or rises to 90% or above.

### Saving Settings to a File


- 1 Click  (Save) on the toolbar or select [Save] on the [Settings] menu.

To save the settings under a different name, select [Save As] on the [Settings] menu.

#### **Note**

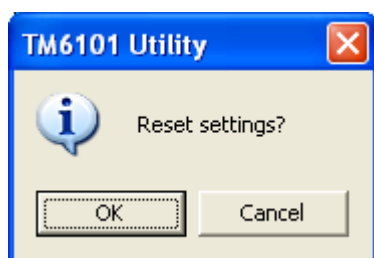
- Even if you don't save the settings to a file, the settings in effect when the TM6101 Utility is exited will be restored the next time it is launched.
- Correction functions (see "2.6 Using Correction Functions"), measurement item settings (see "Changing Measurement Items and the Graph Display") and saving and display settings (see "Configuring File Save and Display Settings") are not saved to the file.

### Loading Settings from a File

- 1 Click  (Open) on the toolbar or select [Open] on the [Settings] menu.
- 2 Select the file to load.

### Resetting Settings

- 1 Select [Reset] on the [Settings] menu.
- 2 A confirmation message will be displayed.



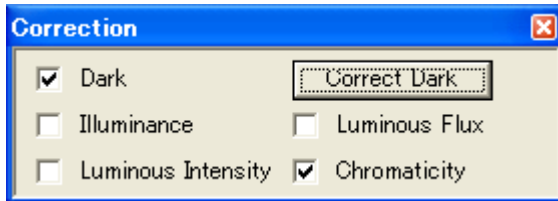
- 3 Click [OK].

#### **Note**

Correction functions (see "2.6 Using Correction Functions"), measurement item settings (see "Changing Measurement Items and the Graph Display") and saving and display settings (see "Configuring File Save and Display Settings") are not reset.

## 2.6 Using Correction Functions

Reference value correction is performed from the Correction window or menu. (For more information about correction functionality, see “2.8 Using Correction Functions” in the TM6101 LED Optical Meter Instruction Manual.)



### Note

- Correction values are automatically saved by TM6101 serial number when the application is exited. If a TM6101 with a different serial number is connected, the previous serial number's correction values will not be applied.
- If you attempt to exit the TM6101 Utility while correction is being performed, there may be a delay in exiting the application while the processing completes. If the task bar shows [Stopping], wait for the application to exit.

## Performing Dark Correction

- 1 Click the [Correct Dark] button or select [Dark]-[Start] on the [Correction] menu.
- 2 The [Correction Dark] dialog box will be displayed.



- 3 Set the average number.
- 4 Select the range for which to perform dark correction ([Now Selected]: Currently selected range; [All]: All ranges).

### Note

- When auto-ranging has been enabled, only [All] can be selected.
- When AC measurement mode is selected, only [All] can be selected.
- If you set the integration time, sensitivity, auto-ranging, or measurement mode or exit the TM6101 Utility after performing correction for the currently selected range, correction values will be cleared, and correction will be disabled.
- Dark correction is performed using the internal trigger, regardless of settings.

- 5 Click [OK].

Measurement for dark correction will begin. During correction, the status bar will indicate [Correcting].

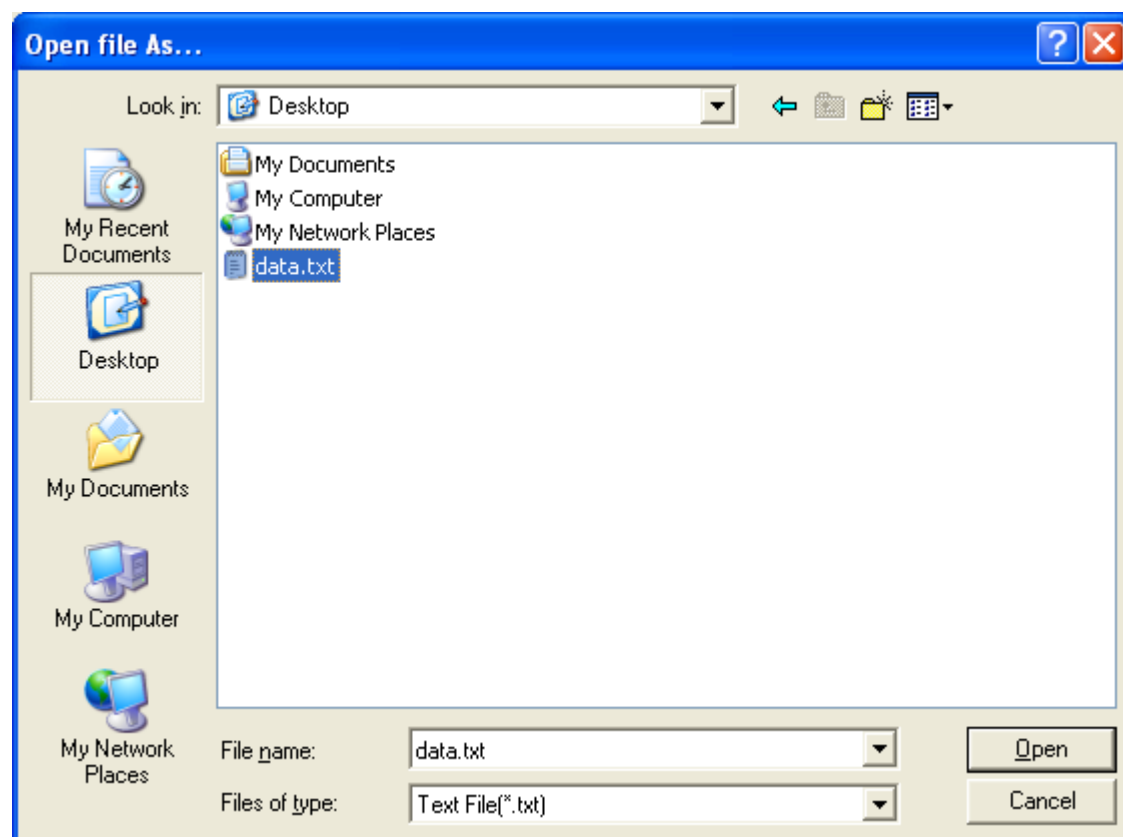
- 6 When the correction process is complete, a confirmation message will be displayed.



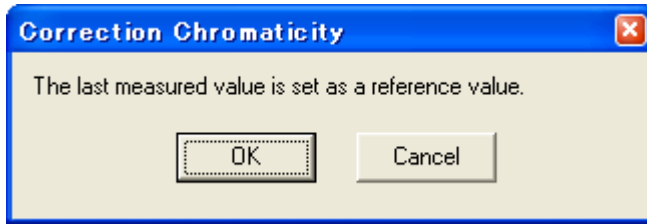
- 7 Click [OK].
- 8 If you do not wish to use correction, deselect the [Dark] checkbox on the [Correction] window or select [Dark]-[On] on the [Correction] menu to deselect it.

### Performing Chromaticity Correction

- 1 Measure the light source that will be used as the reference. For more information about measurement, see “2.7 Taking Measurements”.
- 2 Select [Chromaticity]-[Correct] on the [Correction] menu.
- 3 Select the spectral measurement results file.



- 4 The [Correction Chromaticity] dialog box will be displayed.



- 5 Click [OK].

Reference value correction will be performed.

- 6 When the correction process is complete, a confirmation message will be displayed.

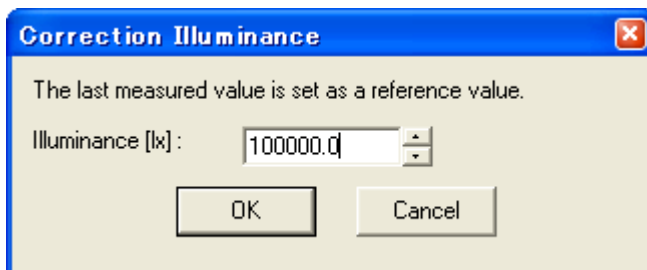


- 7 Click [OK].

- 8 If you do not wish to use correction, deselect the [Chromaticity] checkbox on the [Correction] window or select [Chromaticity]-[On] on the [Correction] menu to deselect it.

### Performing Illuminance Correction

- 1 Measure the light source that will be used as the reference. For more information about measurement, see "2.7 Taking Measurements".
- 2 Select [Illuminance]-[Correct] on the [Correction] menu.
- 3 The [Correction Illuminance] dialog box will be displayed.



- 4 Set the reference value.

- 5 Click [OK].

Reference value correction will be performed.

- 6 When the correction process is complete, a confirmation message will be displayed.

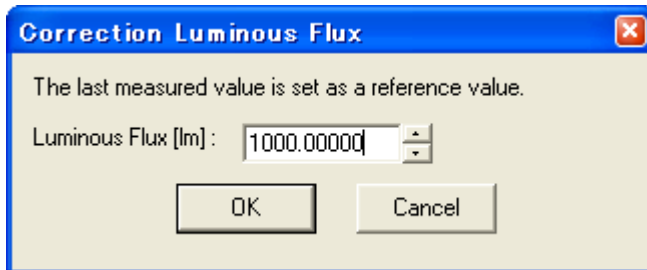


- 7 Click [OK].

- 8 If you do not wish to use correction, deselect the [Illuminance] checkbox on the [Correction] window or select [Illuminance]-[On] on the [Correction] menu to deselect it.

### Performing Luminous Flux Correction

- 1 Measure the light source that will be used as the reference. For more information about measurement, see “2.7 Taking Measurements”.
- 2 Select [Luminous Flux]-[Correct] on the [Correction] menu.
- 3 The [Correction Luminous Flux] dialog box will be displayed.



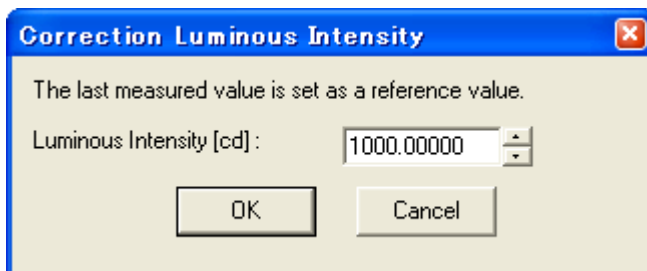
- 4 Set the reference value.
- 5 Click [OK].  
Reference value correction will be performed.
- 6 When the correction process is complete, a confirmation message will be displayed.



- 7 Click [OK].
- 8 If you do not wish to use correction, deselect the [Luminous Flux] checkbox on the [Correction] window or select [Luminous Flux]-[On] on the [Correction] menu to deselect it.

### Performing Luminous Intensity Correction

- 1 Measure the light source that will be used as the reference. For more information about measurement, see “2.7 Taking Measurements”.
- 2 Select [Luminous Intensity]-[Correct] on the [Correction] menu.
- 3 The [Correction Luminous Intensity] dialog box will be displayed.



- 4 Select the reference value.
- 5 Click [OK].  
Reference value correction will be performed.

- 6 When the correction process is complete, a confirmation message will be displayed.



- 7 Click [OK].
- 8 If you do not wish to use correction, deselect the [Luminous Intensity] checkbox on the [Correction] window or select [Luminous Intensity]-[On] on the [Correction] menu to deselect it.

### Saving correction values

Dark correction values and reference value correction values can be saved to a file. Saved correction values can be loaded later as desired.

Correction values are saved automatically when you exit the application and loaded automatically the next time the application is launched. You can also manually save correction values if you wish to load them later.

- 1 Select [Save As...] on the [Correction] menu.
- 2 Enter a filename and click the [Save] button.

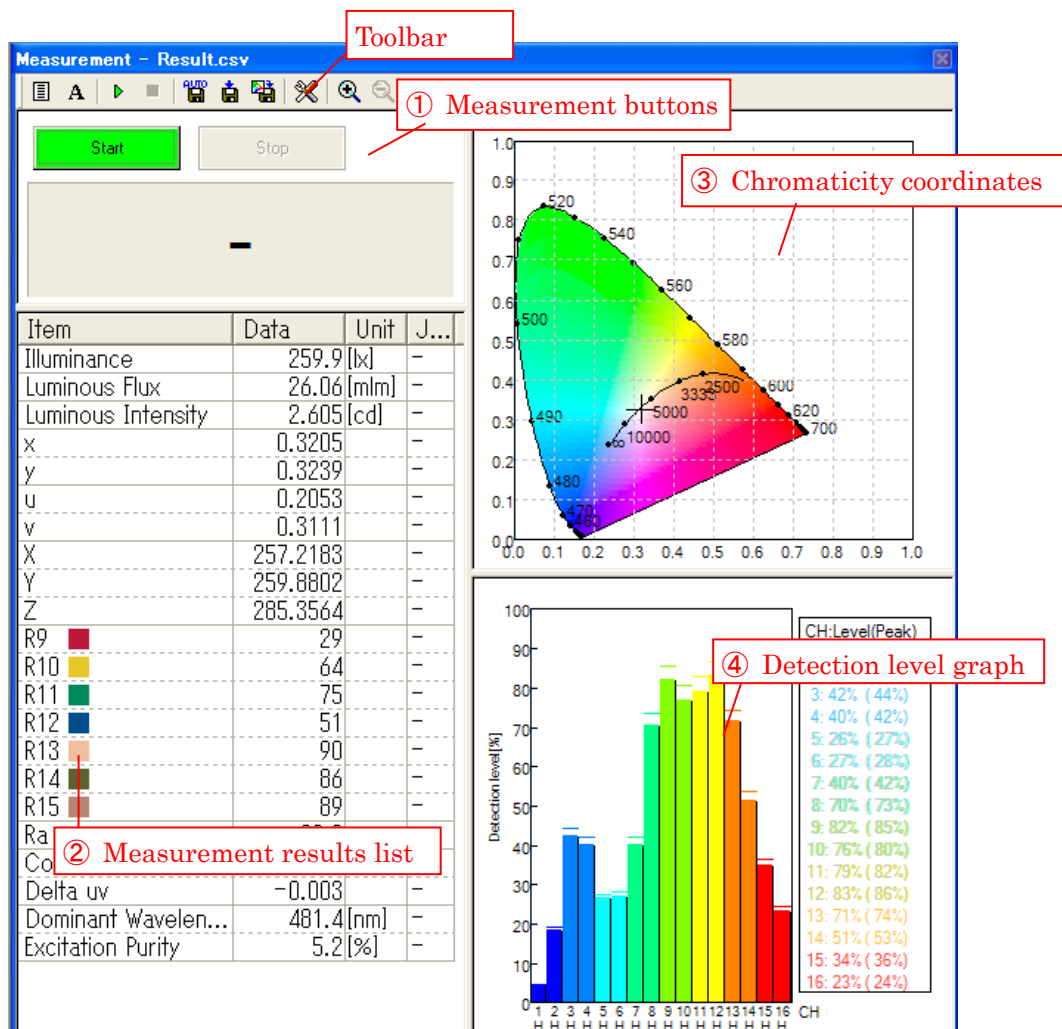
### Loading correction values

You can load previously saved dark correction values and reference value correction values.

- 1 Select [Load settings] on the [Correction] menu.
- 2 Select a correction value file and click the [Open] button.

## 2.7 Taking Measurements

The [Measurement] window consists of the following interface elements. (For more information about measurement, see “Chapter 3 Measurement” in the TM6101 LED Optical Meter Instruction Manual.)



### ① Measurement buttons

These buttons are used to start and stop measurement.

### ② Measurement results list

Measurement results are displayed here as a list. They can be saved to a CSV file or copied to the clipboard. The list also displays special color rendering index test colors.

### ③ Chromaticity coordinates


The chromaticity is indicated with a “+”.

### ④ Detection level graph

Measurement results are shown here as a bar graph. Peak values are displayed as bars. Peak values are cleared when measurement starts and when the sensitivity range or measurement range is changed.




## Starting and Stopping Measurement


- 1 To start measurement, click  (Start) on the toolbar or the [Start] measurement button. When using the internal trigger, measurement will be performed at the set interval. When using an external trigger, the instrument will start monitoring the external trigger.

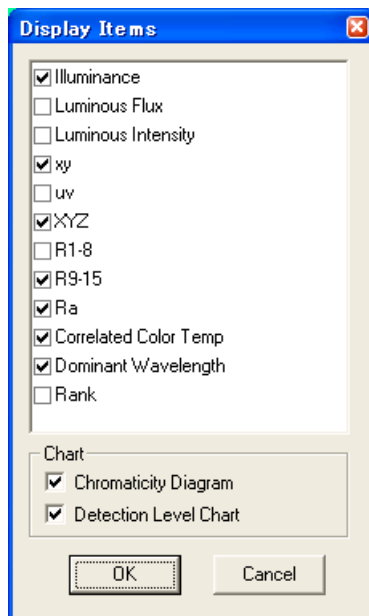
### Note

- External trigger input is only accepted while monitoring the trigger.
- If there is no external trigger input for 100 seconds, a timeout will occur, and the measurement results will indicate an error.
- When the interval time is shorter than the measurement time, the instrument will be unable to take measurements at the set interval. Set the interval time so that it is longer than the measurement time.
- When the measurement time is lengthened, for example due to the average number or integration time, it may take time for measurement to be stopped. If the task bar shows [Stopping], wait for measurement to stop.

- 2 To stop measurement, click  (Stop) on the toolbar or the [Stop] measurement button.

## Changing Measurement Items and the Graph Display

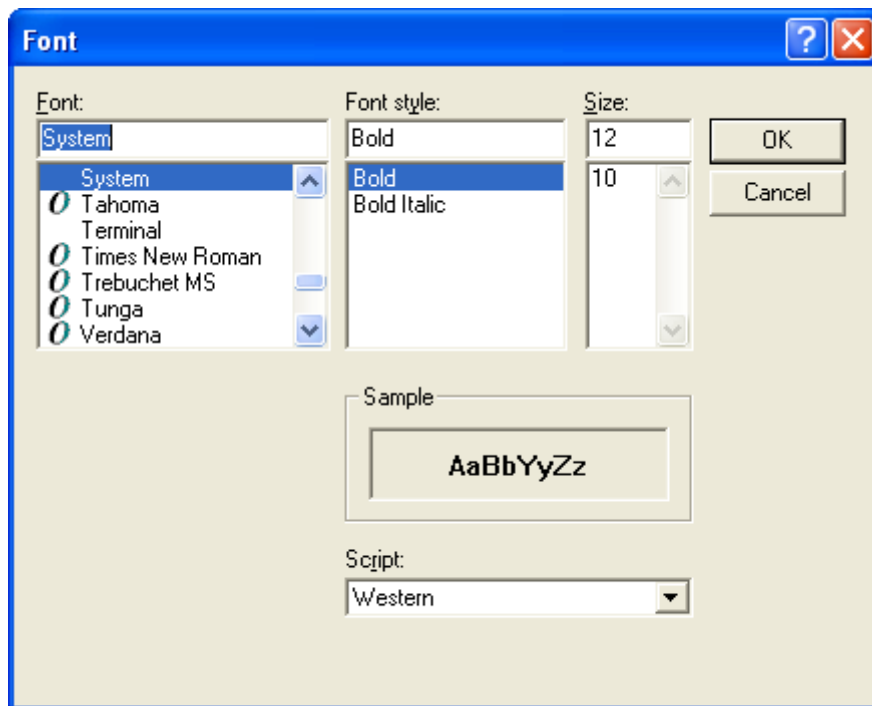
- 1 Click  (Display Items) on the toolbar or select [Display Items] on the [Measurement] menu.
- 2 The [Display Items] dialog box will be displayed.



- 3 Select the checkboxes for the measurement items and graphs you wish to display.
- 4 Click [OK].


### Changing the Text Style for Measurement Results

- 1 Click **A** (Font) on the toolbar or select [Font] on the [Measurement] menu.
- 2 The [Font] dialog box will be displayed.



- 3 Configure the font settings as desired.
- 4 Click [OK].


### Saving Measurement Results for Individual Measurements to a CSV File

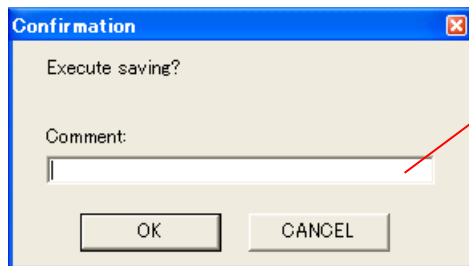
- 1 Turn on the auto-save function by clicking  (Auto Save) on the toolbar or selecting [Auto Save] on the [Measurement] menu.
- 2 A new line containing the measured value will be added to the CSV file each time a measurement is completed.

**To change the filename, delimiter, or decimal point character:**

→ see “Configuring File Save and Display Settings”

### Saving the Currently Displayed Measurement Results to a CSV File

- 1 Click  (Manual Save) on the toolbar or select [Manual Save] on the [Measurement] menu.
- 2 When the confirmation dialog box is displayed, click [OK].



Comment input field

Enter a comment to be saved in the last row of the CSV file.

#### To disable confirmation dialog boxes


→ see “Configuring File Save and Display Settings”

- 3 A line containing the measured value will be added to the file.

#### To change the filename, delimiter, or decimal point character:








→ see “Configuring File Save and Display Settings”

### Saving the measurement screen as an image file

- 1 Click on  (Save Image) on the toolbar or select “Save Image” on the “Measurement” menu.
- 2 Select the file type, enter a filename, and click the “Save” button.  
The measurement time and date are used as the default filename.

### To Copy the Currently Displayed Measurement Results to the Clipboard

- 1 Right-click on the measurement results list and select [Copy].


Item	Data	Unit	J...
Illuminance	1091.4	[lx]	-
x	0.3125	-	-
y	0.3168	-	-
u	0.024	-	-
v	0.3078	-	-
X	1076.445	-	-
Y	1091.364	-	-
Z	1276.674	-	-
R9 	17	-	-
R10 	59	-	-
R11 	74	-	-
R12 	44	-	-
R13 	83	-	-
R14 	89	-	-
R15 	81	-	-
Ra	80.5	-	-
Correlated Color ...	6619	[K]	-
Delta uv	-0.003	-	-
Dominant Wavelen...	480.6	[nm]	-
Excitation Purity	8.6	[%]	-

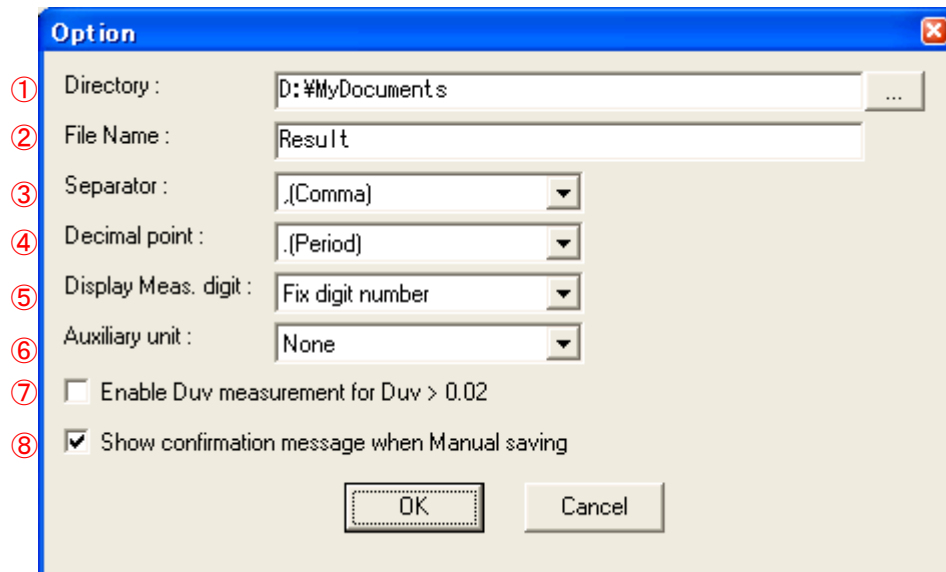
- 2 The measurement results will be copied to the clipboard.

**To change the delimiter or decimal point character:**

→ see “Configuring File Save and Display Settings”

## Configuring File Save and Display Settings

- 1 Click  (Option) on the toolbar or select [Option] on the [Measurement] menu.
- 2 The [Option] dialog box will be displayed.



- ① Selects the folder in which to save the CSV file.
- ② Selects the name of the CSV file.
- ③ Selects the delimiter ([Comma], [Semicolon], [Tab], [Space]).
- ④ Selects the decimal point character ([Period], [Comma]).
- ⑤ Selects the number of display digits.

([Fix digit number]: Fix the number of digits; [Fix after the decimal point]: Fix the number of digits after the decimal point)

### Note

The number of digits after the decimal point will be fixed for values saved to CSV files, regardless of this setting.

- ⑥ Selects the auxiliary unit.

#### [Fix digit number]:

([None]: No auxiliary unit; [Auto]: Automatic auxiliary unit)

#### [Fix after the decimal point]:

([None]: No auxiliary unit; [m] (milli): m (Milli) display; [k]: k (Kilo) display)

### Note

Values are saved to CSV files without an auxiliary unit, regardless of this setting.

- ⑦ Selecting this checkbox enables Duv measurement results even when  $|Duv| > 0.02$ . Ordinarily, a Duv value greater than 0.02 will result in a calculation error. This checkbox should be left unselected during normal operation.
- ⑧ Selecting this checkbox causes a confirmation dialog box to be displayed when saving data manually.  
→See “Saving the Currently Displayed Measurement Results to a CSV file”

3 Click [OK].

### CSV Files

An example CSV file is shown below (using a comma delimiter):



<pre>"Date(y/m/d)","Time(h:m:s.ms)", meas. item name, meas. item name, ..., setting item name, setting item name, ..., correction item name, correction item name,</pre>	
<pre>Date, time, measured value, measured value, ..., setting, setting, ..., ON, ON, Date, time, measured value, measured value, ..., setting, setting, ..., ON, ON, ....</pre>	<p><b>Data</b></p> <p><b>Header</b></p>

- The time is output to the file in milliseconds. If this data is not displayed properly in Excel, set the cell format to a user-defined "hh:mm:ss.000."
- Invalid setting items and correction items will not be output to the file.
- If the settings are changed, the header will be re-output to the file.

## About the xy chromaticity diagram

You can zoom in and out on the xy chromaticity diagram and display a variety of information.

- Zooming in and out

Click  (Zoom In) /  (Zoom Out) on the tool bar or Select [Diagram]-[Zoom In] / [Zoom Out] on the [View] menu. Alternately, right-click the mouse and then select [Zoom In] / [Zoom Out] on the contextual menu.

- Moving to a displayed coordinate

Double-click on the xy chromaticity diagram at the location where you wish to center the display. Alternately, right-click the mouse at the location where you wish to center the display and select [Center] on the contextual menu. You can also move the display coordinates by dragging the mouse on the chromaticity diagram.

- Initializing the display

Select [Diagram]-[Reset] on the [View] menu. Alternately, right-click the mouse and select [Reset] on the contextual menu.

- Show/hide information

Select the information you wish to show or hide under [Chromaticity diagram] on the [View] menu. All information is displayed by default.

Painting	: Chromaticity diagram fill
Grid	: Grid display
Planckian locus	: Planckian locus display
Spectrum line	: Spectrum locus and purple boundary display
Character	: Text display
Rank	: Chromaticity rank display

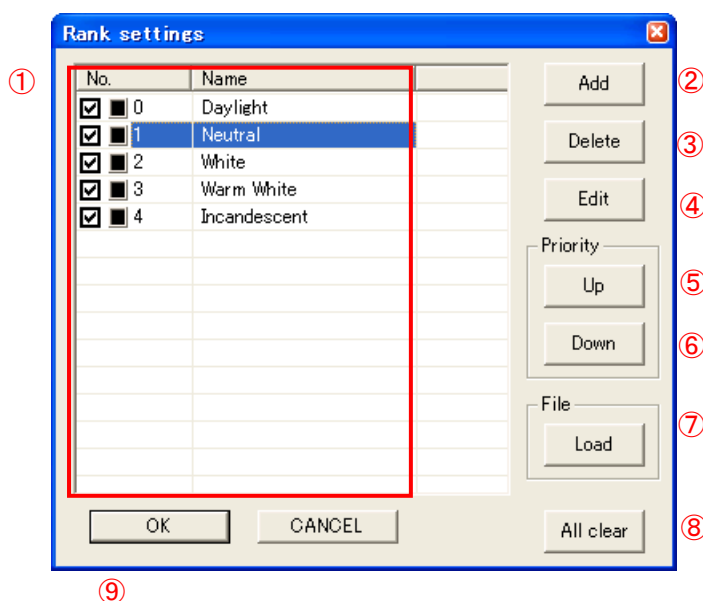
## 2.8 Rank Detection Function

This function detects whether the measured chromaticity value falls inside a specified quadrilateral chromaticity range (rank). **Up to 256 ranks can be registered.**

### Registering a rank

- 1 Click the [Rank set] button in the [Judgment] frame on the settings window. Alternately, select [Rank setting] on the [Settings] menu.

The Rank Settings dialog box will be displayed. (In this example screenshot, several ranks have already been registered.)



- ① Numbers and names of registered ranks. Rank numbers are used on the measurement results display screen. Smaller numbers indicate a higher rank priority. During measurement, detection starts with the highest-priority rank and proceeds in order of decreasing priority.

#### Note

The checkboxes are used by the judgment function. Ranks whose checkbox is selected are targeted for judgment.

→See “Configuring the Judgment Process”

- ② [Add] button: Adds a new rank.
- ③ [Delete] button: Deletes the selected rank.
- ④ [Edit] button: Edits the selected rank.
- ⑤ [Up] button: Moves the selected rank up one priority level.
- ⑥ [Down] button: Moves the selected rank down one priority level.
- ⑦ [Load] button: Loads rank settings alone from a settings file (extension: .hls).
- ⑧ [All clear] button: Deletes all registered ranks.



⑨ [OK] button: Accepts the settings.

2 Click the [Add] button.

When the Polygon Edit dialog box is displayed, enter the name of the rank and set the four quadrilateral vertices that define the rank.

① Enter the name of the rank.

② Set the display color for the rank. Click the button to display a color selection dialog box and select the desired color.

③ Enter the x and y coordinates for the No. 1 vertex of the rank's quadrilateral.

④ Enter the x and y coordinates for the No. 2 vertex of the rank's quadrilateral.

⑤ Enter the x and y coordinates for the No. 3 vertex of the rank's quadrilateral.

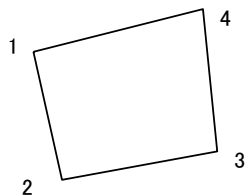
⑥ Enter the x and y coordinates for the No. 4 vertex of the rank's quadrilateral.

3 Click [OK] to accept the settings.

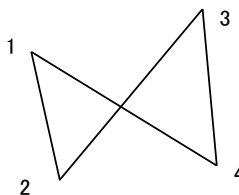
#### **Note**

Enter the vertices for the rank's quadrilateral in order so that the segments do not cross one another. Failure to enter the coordinates in the proper order will cause an error message to be displayed. If you encounter this error, change the order of entry to avoid crossing segments.


Proper order:

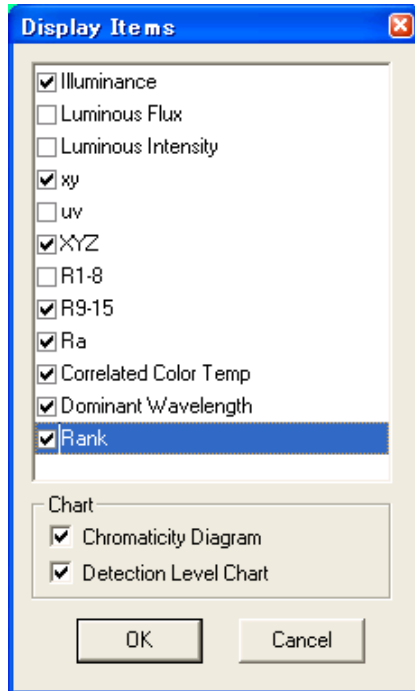


Improper order:



### Displaying rank detection results

- 1 Select  (Display Items) on the tool bar or select [Display Items] on the [Measurement] menu.
- 2 The Display Items dialog box will be displayed.



- 3 Select the [Rank] checkbox.
- 4 Click [OK].
- 5 When measurement is performed, the rank detection results will be displayed in the measurement results list. Detection results are shown using the rank name.

## 2.9 Judgment Function

The judgment function can be used to determine whether the measurement results fall inside a specified range.

Judgment items:

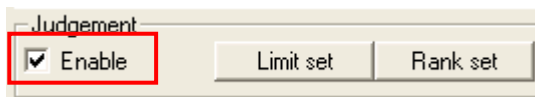
Illuminance, luminous flux, luminous intensity, chromaticity (x, y, u, v), tristimulus values (X, Y, Z), special color rendering index (R1 to R15), general color rendering index, correlated color temperature, delta uv, dominant wavelength, excitation purity, chromaticity rank

Judgment methods:

Judgment method	Description	Standard for "IN" judgment
Judgment using an upper limit	Judges whether the measured value is less than or equal to a specified upper limit.	Measured value $\leq$ upper limit
Judgment using a lower limit	Judges whether the measured value is greater than or equal to a specified lower limit.	Measured value $\geq$ lower limit
Judgment using upper and lower limits	Judges whether the measured value is less than or equal to a specified upper limit and greater than or equal to a specified lower limit.	Lower limit $\leq$ measured value $\leq$ upper limit
Judgment using chromaticity rank	Judges whether the measured chromaticity value (x, y) falls within a registered rank.	When the chromaticity measurement results fall inside a rank for which judgment has been enabled.

## Configuring the Judgment Process

- 1 Select the [Enable] checkbox in the [Judgment] frame on the settings window.

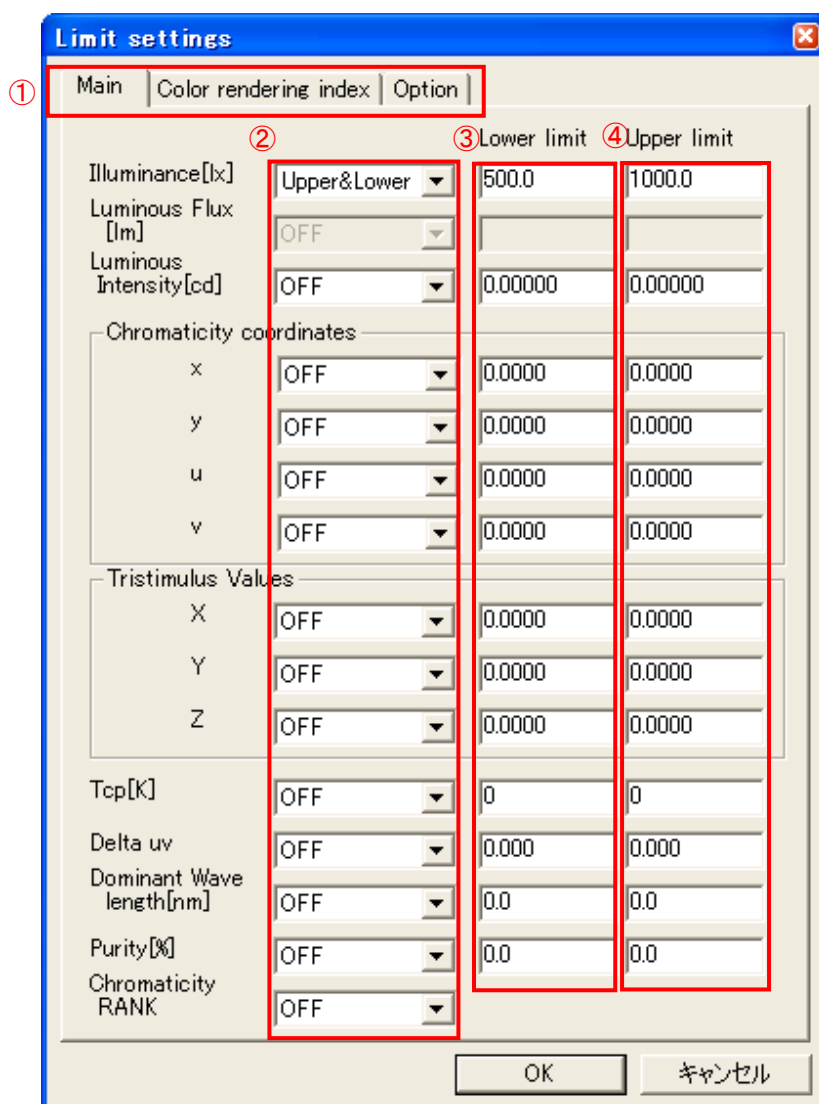


- 2 Click the [Limit set] button in the [Judgment] frame on the settings window. Alternately, select [Limit setting] on the [Settings] menu.

### Note

The judgment item settings on the following page include only those measurement items whose display is enabled. If you are unable to enter the measurement item whose judgment settings you wish to configure, enable display of that item.

→ see "Changing Measurement Items and the Graph Display"



- ① Select the judgment item you wish to configure.

Main : Items other than the following

Color rendering index : Special color rendering index and general color rendering index

Option : Sets judgment options.

- ② Sets the judgment method.

OFF : Do not perform judgment.

Upper limit : Perform judgment using an upper limit.

Lower limit : Perform judgment using a lower limit.

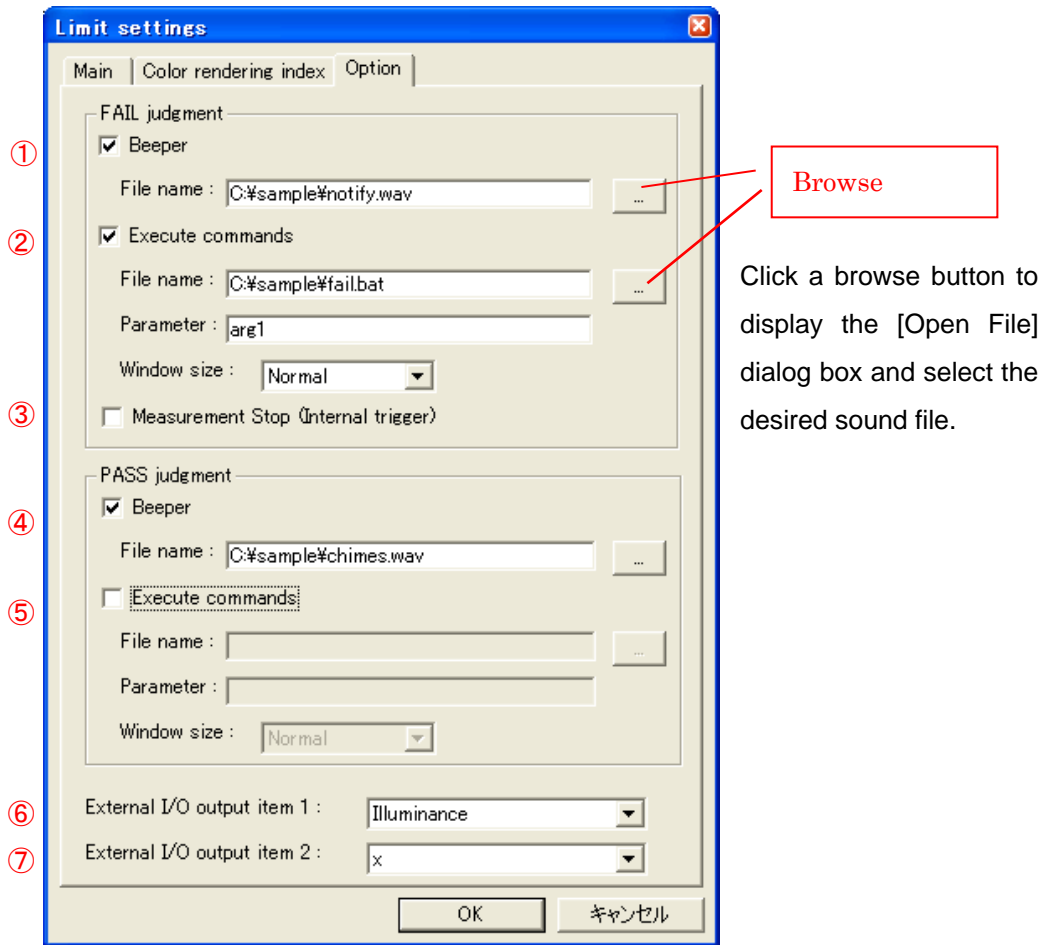
Upper&Lower : Perform judgment using both upper and lower limits.

ON : When the judgment item is [Chromaticity Rank], enable judgment.

- ③ Sets the lower limit (when the judgment method is [Lower limit] or [Upper&Lower]).

- ④ Sets the upper limit (when the judgment method is [Upper limit] or [Upper&Lower]).

- 3 Set the judgment options. Select the (1) [Option] tab.

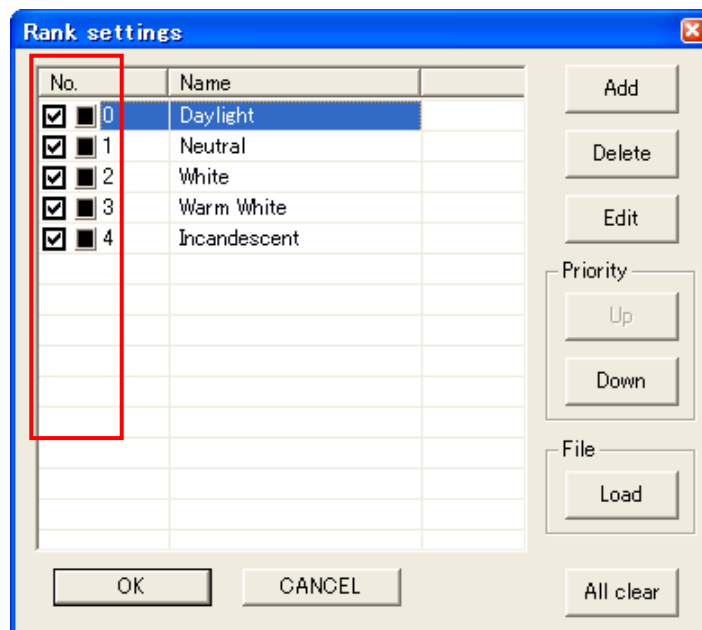


- ① Select this checkbox and select a sound file if you wish to play an alert sound when the overall judgment is [FAIL].
- ② Select this checkbox and specify a file when you wish to execute an EXE or other file when the overall judgment is FAIL. Specify arguments as necessary in the "Parameter" field. You can also specify the window size to use at execution.
- ③ Select this checkbox when you wish to stop measurement when the overall judgment is FAIL during continuous measurement.
- ④ Select this checkbox and select a sound file if you wish to play an alert sound when the overall judgment is [PASS].
- ⑤ Select this checkbox and specify a file when you wish to execute an EXE or other file when the overall judgment is PASS. Specify arguments as necessary in the "Parameter" field. You can also specify the window size to use at execution.
- ⑥ Sets judgment item 1 for which to generate external output.
- ⑦ Sets judgment item 2 for which to generate external output.

**Note**

- Provide a sound file (in the WAVE format with extension .wav) in advance. You may be unable to play sounds depending on your computer setup.
- When reset the settings, the alert sound are not reset.

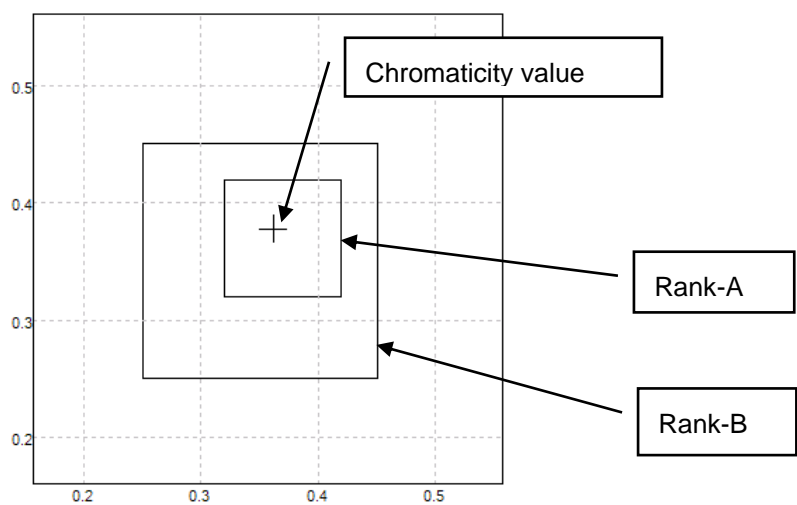
- 4 Click [OK].
- 5 If you have set chromaticity rank judgment to [ON], configure the judgment ranks.  
Click the [Rank set] button in the [Judgment] frame on the settings window. Alternately, select [Rank set] on the [Settings] menu.
- 6 Select the checkbox next to the numbers of any registered ranks for which you wish to enable judgment.



- 7 Click [OK].

**Note**  
Chromaticity rank judgment yields an “IN” judgment when the chromaticity measurement results fall inside a rank for which judgment has been enabled. Conversely, an “OUT” judgment is yielded when the chromaticity measurement results fall inside a rank for which judgment has been disabled. Smaller numbers indicate a higher rank detection priority.

For example, if Rank-A and Rank-B are registered with overlapping chromaticity ranges as in the following diagram, the rank detection result will be “Rank-A” if “Rank-A” has a higher priority.



If judgment is performed with the Rank-A judgment enable checkbox unselected, the judgment result will be “OUT” since the rank detection result is “Rank-A.” The judgment result can be changed to “IN” by increasing Rank-B’s priority.

No.	Name
<input type="checkbox"/> 0	Rank-A
<input checked="" type="checkbox"/> 1	Rank-B

➡

RankRank-AOUT

No.	Name
<input checked="" type="checkbox"/> 0	Rank-B
<input type="checkbox"/> 1	Rank-A

➡

RankRank-BIN

## Displaying judgment results

When measurement is performed, judgment results are displayed in the measurement window.

Item	Data	Unit	J...
Illuminance	854.3	[lx]	IN
x	0.3519		—
y	0.3731		—
Ra	78.5		LO
Correlated Color...	4839	[K]	—
Delta uv	0.008		—
Dominant Wavele...	569.3	[nm]	—
Excitation Purity	17.4	[%]	—
Rank	Neutral		IN

### ① Overall judgment

Displays the overall judgment.

**PASS** : When the judgment results for measurement items for which judgment has been enabled are all “IN”

**FAIL** : When one or more of the judgment results for measurement items for which judgment has been enabled are a result other than “IN”

### ② Judgment results

Displays the judgment results for individual measurement items.

**IN** : When the measurement result falls inside the specified judgment range  
When the rank detection result falls inside the rank  
(Ranks for which judgment has been enabled only)

**HI** : When the measurement result is greater than the upper limit

**LO** : When the measurement result is less than the lower limit

**OUT** : When the rank detection result falls outside the registered ranks  
(Ranks for which judgment has been enabled only)

When the detection level is overflow

**--** : When judgment has been disabled



**Note**

Internal calculations are performed using floating-point values, and judgments are based on more digits than are displayed.

Because measurement results are rounded to the number of display digits so that they fit on the display, identical measurement result displays may in fact correspond to different judgment results.

**Example:**

If the displayed value for an R1 measurement result is 78, the corresponding internal value is as follows:

$$77.5 \leq \text{internal value} < 78.5$$

Consequently, if the judgment upper limit has been set to 78, the judgment result will be IN or HI.

## Chapter 3 Menu Commands

Menu and command			Description
Measurement	Display Items		Measurement items and graph display settings
	Font		Font settings for measurement results list
	Start		Start measurement
	Stop		Stop measurement
	Auto Save		Enable/disable auto-save functionality
	Manual Save		Manually save data
	Save Image		Saves the measurement screen as an image.
	Option		Display and file save settings
Settings	Open		Open settings file
	Save		Save settings file
	Save As		Save settings file under different filename
	Reset		Initialize settings
	Limit setting		Judgment settings
	Rank setting		Rank settings
Correction	Dark	ON	Enable/disable dark correction
		Start	Perform dark correction
	Illuminance	ON	Enable/disable illuminance correction
		Correct	Perform illuminance correction (using the current measured value)
	Luminous Flux	ON	Enable/disable luminous flux correction
		Correct	Perform luminous flux correction (using current measured value)
	Luminous Intensity	ON	Enable/disable luminous intensity correction
		Correct	Perform luminous intensity correction (using current measured value)
	Chromaticity	ON	Enable/disable chromaticity correction
		Correct	Perform chromaticity correction (using current measured value)
	Save As		Save correction values
	Load settings		Load correction values
Connection	Open Device		Connect to the TM6101
	Close Device		Disconnect from the TM6101

Menu and command			Description
View	Settings		Display/hide settings window
	Correction		Display/hide correction window
	Chromaticity diagram	Reset	Reset chromaticity coordinates
		Zoom In	Zoom in on chromaticity coordinates
		Zoom Out	Zoom out from chromaticity coordinates
		Painting	Paint chromaticity diagram
		Grid	Display grid
		Planckian locus	Display Planckian locus
		Spectrum line	Display spectrum locus and purple boundary
		Character	Display text
		Rank	Display chromaticity rank
Help	Version		Check software version

## Chapter 4 List of Messages

### 4.1 Measured Values

Display	Description
OverRange	Value out of display range →Change the display digits or auxiliary unit (See “Configuring File Save and Display Settings”)
Overflow	Detection level overflow →In normal measurement mode, adjust the integration time and sensitivity. In AC measurement mode, adjust the range (See “2.5 Configuring Settings”)
Underflow	Detection level zero →The TM6101 may be experiencing an internal failure. Have the unit repaired.
Error	Other error •Settings have not been applied. •Unable to acquire setting. •External trigger timeout                      Etc.

### 4.2 Status Bar

Display	Description
No connect.	The software is not connected to the TM6101.
Sensor error.	The sensor unit has not been connected, has been connected backwards, or has a serial number that does not match the main unit. Connect the sensor unit properly, select [Close Device] on the [Connection] menu, and then select [Open Device] on the [Connection menu].
Ready	The system is ready to start measurement.
Correcting	Correction is being performed.
Measuring	Measurement is being performed.
Wait measurement	The system is ready to perform measurement.
Stopping	The system is stopping measurement.
Wait trigger	The system is waiting for external trigger input or performing external trigger measurement.
Complete manual saving	Data was saved manually.

### 4.3 Messages

Message	Description → Corrective action
Communication error. Please check the connection with TM6101.	Communications error. Verify the connection with the TM6101. →Connect the AC adapter and USB cable properly. →Install the driver properly.
Sensor error. Please check the sensor connection with TM6101.	Sensor unit connection error. Verify that the main unit and sensor unit are properly connected.
The Serial No. of the sensor is different from that of the main unit. Please connect the sensor unit. (Serial No.)	The main unit and sensor unit have different serial numbers. Connect a main unit and sensor unit that share the same serial number.
Initialization error.	Initialization error. →Verify that all cables are properly connected. →Install the driver properly. →Be sure to use the recommended operating environment. →Relaunch the application.
Over 100000[lx] !	The measurement target exceeds 100,000 lx. →Avoid exposing the instrument to light sources in excess of 100,000 lx. Doing so may cause degradation of optical components inside the sensor unit.
Out of range.	The set reference value correction value exceeds the valid range. →Correction can only be performed within the valid setting range. Check value.
Failed to save file. Auto Save will be disabled.	Unable to save file. Auto-save has been disabled. →Verify that the folder name and filename are legitimate. →Check whether the file has been opened by another application.

Message	Description → Corrective action
Dark Correction is set OFF. Start measuring?	Dark correction is off. Start measuring with dark correction off? →Normal measured values cannot be obtained without performing dark correction. Be sure to perform dark correction before taking measurements.
The correction factor of TM6101 connected before is not applicable to the TM6101 which is now connected.	Correction values for a previously connected TM6101 cannot be applied to the currently connected TM6101. →Reference value correction values are managed by TM6101 serial number. When a TM6101 with a different serial number is connected, correction values for any previously connected instrument will not be applied. Repeat the correction process for the TM6101 with the new serial number.
Sensitivity cannot be set High when the integration time is 0.1ms.	The sensitivity cannot be set to high when the integration time is 0.1 ms.
Integration time cannot be set at 0.1ms when the sensitivity is set High.	The integration time cannot be set to 0.1 ms when the sensitivity is set to high.
File format Error. No data to read.	Settings file format error. Data cannot be read. →The settings file is corrupted. Do not edit settings files with software other than the TM6101 Utility.
Failed to open file.	Unable to open settings file. →The settings file does not exist. Verify the settings file.
Invalid values.	An invalid value was entered. Enter a valid value.



---

# User's License Agreement

## Important

Please read the following agreement carefully. This user's license agreement (hereafter referred to as Agreement) is a legal contract between the software user (individual or institution) and HIOKI E. E. CORPORATION (hereafter referred to as HIOKI). The term "software" includes any related electronic documentation and computer software and media, as well as any printed matter (such as the Instruction Manual).

By installing, reproducing, or using the software, you, the Licensee, agree to accept the license terms set forth in this Agreement.

---

This software is protected by copyright laws, international copyright agreements, as well as non-corporate laws. The software is a licensed product, and is not sold to the user.

### 1. License

This Agreement grants you, the Licensee, a license to install a single copy of the software on a specified computer system.

### 2. Explanation of other rights and restrictions

-1. Restrictions on reverse engineering, decompiling, and disassembling:

You may not reverse engineer, decompile, or disassemble the software.

-2. Separation of components:

This software is licensed for use as a single product. You may not separate the components for use on multiple computer systems.

-3. Loaning:

You may not loan or lease the software.

-4. Transfer of software:

You may transfer full rights in accordance with this Agreement. However, if you do so, you may not retain any copy of the software, but must transfer the software in its entirety (all components, media, related documentation such as the Instruction Manual, and this Agreement), and must ensure that the receiver of the software agrees with the terms set forth in this Agreement.

-5. Cancellation:

In the event that the terms and conditions set forth in this Agreement are violated, HIOKI retains the right to cancel this Agreement without compromise of any of its other rights. In this event, you must destroy all copies of the software and its components.

### 3. Copyright

The title and copyright rights concerning the software's related documentation, such as the Instruction Manual and copies of the software, are the property of HIOKI and other licensors, and are protected by copyright laws and international agreement regulations. Accordingly, you must treat the software as you would any other copyrighted document. However, you are permitted to make copies as indicated in (A) and (B) below provided such copies are not intended for use other than back-up purposes.

(A) You may make a single copy of the software.

(B) You may install this software on a single computer.

However, you may not reproduce the documentation supplied with the software, such as the Instruction Manual.

---



---

#### **4. Dual media software**

You may receive the same software on more than one type of media. However, regardless of the type and size of media provided, you may only use one media type and only on a single computer. You must not use or install the other media on any other computer. Furthermore, except when transferring the software as stipulated above, you may not loan, lease, or transfer the other media to any other user.

#### **5. Warranty**

- 1. HIOKI reserves the right to make changes to the software specifications without any prior warning.
  - 2. If the software does not operate in accordance with the supplied Instruction Manual, or the software media or Instruction Manual are damaged in any way, you have one year from the date of purchase to apply for either an exchange or repair at HIOKI's discretion.
  - 3. In no event will HIOKI be liable for any damages resulting from fire, earthquake, or actions of a third party under the conditions stated in item number 2 above, or for any damage caused as a result of your using the software incorrectly or under unusual circumstances. Further, the warranty is invalid if the following occurs:
    - (A) Damage incurred through transport, moving, droppage, or any other kind of impact after you purchased the software.
    - (B) Damage incurred through any form of alteration, unwarranted servicing, or any other type of mistreatment.
  - 4. In the event that the software is exchanged or repaired, the period of warranty expires on the latest occurring date out of the day stated in the original warranty, and exactly 6 months from the day the exchanged/repaired software is returned to you.
  - 5. Regardless of the grounds for making a legal claim, HIOKI and its licensors will not be liable for any damage incurred (including, but not limited to: lost profits, suspension of business, loss of data or lost savings) unstated in the warranty terms for the use of this software. This is true even if HIOKI is notified of the possibility of such damages. In any event, HIOKI's liability shall be limited only to replacing defective software with software that is not defective.
-

# HIOKI

<http://www.hioki.com>



**All regional  
contact  
information**

**HEADQUARTERS**

81 Koizumi  
Ueda, Nagano 386-1192 Japan

**HIOKI EUROPE GmbH**

Rudolf-Diesel-Strasse 5  
65760 Eschborn, Germany  
[hioki@hioki.eu](mailto:hioki@hioki.eu)

1906 EN

Edited and published by HIOKI E.E. CORPORATION

Printed in Japan

- CE declarations of conformity can be downloaded from our website.
- Contents subject to change without notice.
- This document contains copyrighted content.
- It is prohibited to copy, reproduce, or modify the content of this document without permission.
- Company names, product names, etc. mentioned in this document are trademarks or registered trademarks of their respective companies.