DL850E/DL850EV

Acquisition Software

USER'S MANUAL

YOKOGAWA
Yokogawa Test & Measurement Corporation

IM DL850E-61EN
7th Edition

Thank you for purchasing the DL850E ScopeCorder or DL850EV ScopeCorder Vehicle Edition (hereinafter, “DL850E/DL850EV” will refer to both of these products).
This user’s manual explains the functions and operating procedures of the DL850E/DL850EV Acquisition Software. To ensure correct use, please read this manual thoroughly before beginning operation.
After reading this manual, keep it in a safe place.

List of Manuals

The following manuals, including this one, are provided as manuals for the DL850E/DL850EV. Please read all manuals.

Manual Title	Manual No.	Description
DL850E/DL850EV ScopeCorder Features Guide	IM DL850E-01EN	The supplied CD contains the PDF file of this manual. The manual explains all the DL850E/DL850EV features other than the communication interface features. You can view the same information in the DL850E/DL850EV help files.
DL850E/DL850EV ScopeCorder User’s Manual	IM DL850E-02EN	The supplied CD contains the PDF file of this manual. The manual explains how to operate the DL850E/DL850EV.
DL850E/DL850EV ScopeCorder Getting Started Guide	IM DL850E-03EN	This guide explains the handling precautions and basic operations of the DL850E/DL850EV.
DL850E/DL850EV ScopeCorder Communication Interface User’s Manual	IM DL850E-17EN	The supplied CD contains the PDF file of this manual. The manual explains the DL850E/DL850EV communication interface features and instructions on how to use them.
DL850E/DL850EV ScopeCorder Real Time Math/Power Math User’s Manual	IM DL850E-51EN	The supplied CD contains the PDF file of this manual. The manual explains the features of the DL850E/DL850EV Real Time Math/Power Math option and how to use them.
DL850E/DL850EV ScopeCorder Acquisition Software User’s Manual	IM DL850E-61EN	This manual. The supplied CD contains the PDF file of this manual. The manual explains all the features of the acquisition software, which records and displays data measured with the DL850E/DL850EV on a PC.
Precautions Concerning the Modules	IM 701250-04E	The manual explains the precautions concerning the modules.
Model DL850E ScopeCorder, Model DL850EV ScopeCorder Vehicle Edition, User’s Manual	IM DL850E-92Z1	Document for China
Model DL850E ScopeCorder, Model DL850EV ScopeCorder Vehicle Edition Radio Equipment Directive (RED)	IM DL850E-04Z2	Document for RE directive (for /C30 option).

The “EN”, “E”, “Z1” and “Z2” in the manual numbers are the language codes.

Contact information of Yokogawa offices worldwide is provided on the following sheet.

Document No.	Description
PIM 113-01Z2	List of worldwide contacts

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Revisions

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- 4th Edition: October 2015
- 5th Edition: July 2017
- 6th Edition: November 2017
- 7th Edition: May 2018

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How to Use This Manual

Structure of the Manual

This manual contains 11 chapters and an index.

Chapter	Title	Description
1	**What the Acquisition Software Can Do**	Gives an overview of the Acquisition Software and the details of its functions.
2	**Installation**	Explains how to install and uninstall the Acquisition Software and how to install the USB driver.
3	**Connecting to a DL850E/DL850EV**	Explains how to connect the DL850E/DL850EV ScopeCorder to your PC.
4	**Configuring Channels**	Explains how to set measurement for each input module and how to start measurements.
5	**Setting Measurement Conditions**	Explains how to set the acquisition mode, sample rate, and the like.
6	**Recording Measured Data**	Explains how to record data measured by the DL850E/DL850EV on a PC or to the optional DL850E/DL850EV internal hard disk.
7	**Display**	Explains how to display waveforms of measured data and how to set the screen.
8	**Saving and Loading Data**	Explains how to save Acquisition Software setup data, how to load previous setup data, how to save measured waveforms as images, and how to save waveform data in the DL850E/DL850EV memory to a PC.
9	**Other Features**	Explains how to set the clock, the start-up and exit options, as well as how to perform key lock, calibration, and the like.
10	**Maintenance**	Describes error messages.
11	**Specifications**	Provides the Acquisition Software specifications.
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Contents

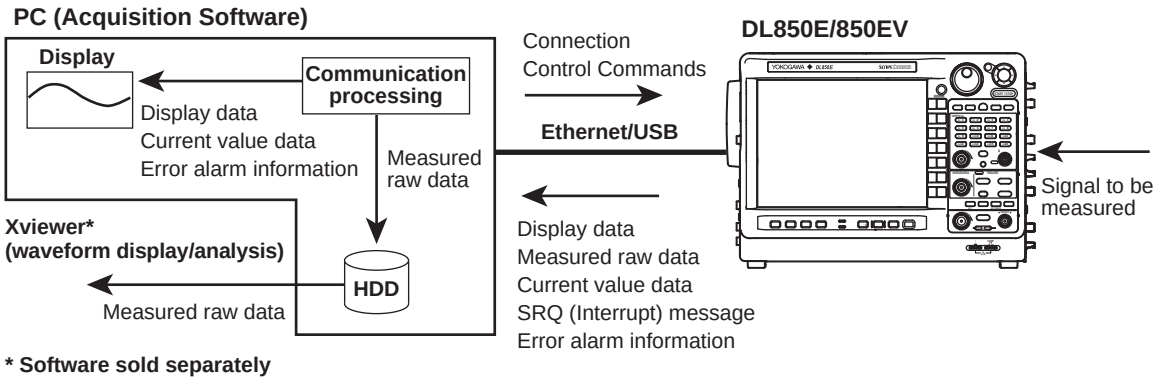
1.1 Acquisition Software Overview

The Acquisition Software is used to connect to a DL850E/DL850EV via the USB interface or the Ethernet interface and record and display data that the DL850E/DL850EV has measured.
The Acquisition Software allows you to do the following:

- Set measurement and record conditions of a DL850E/DL850EV.
- Start and stop measurements on a DL850E/DL850EV.
- Start and stop recording.
- Display waveforms of the measured data, cursor values, and waveform parameters.

Signal and Data Flow

The signal and data flow between this software and the DL850E/DL850EV is described below.



*** Software sold separately**

Display Data

P-P compression data that the DL850E/DL850EV creates for displaying waveforms.

Measured Raw Data

All the measured data that the DL850E/DL850EV acquired. The data is sent to a PC to be stored on the its hard disk.
You can use Xviewer, sold separately, to display waveforms and analyze data.

Current Value Data

Current value data is instantaneous data calculated by the DL850E/DL850EV. The data is sent immediately in response to a request from a PC.

SRQ (Interrupt) Message

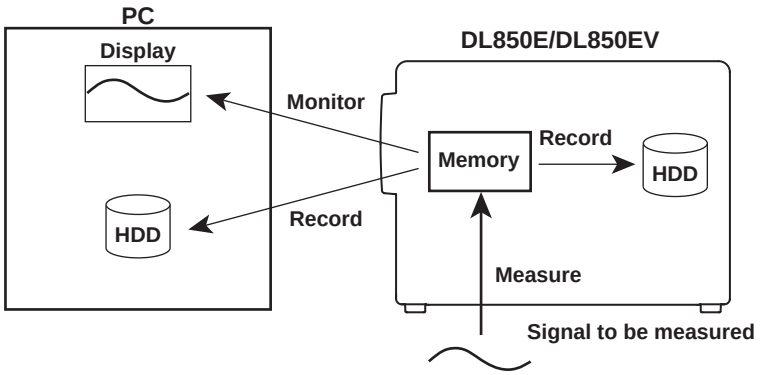
A service request message that indicates measurement end, error occurrence, and other events detected by the DL850E. The message is handled using an interrupt provided by the VISA interface on a PC.

Error and Alarm Information

Errors and alarms that occur during DL850E/DL850EV measurement can be displayed.

Monitoring (Measurement) and Recording

This software refers to the task of acquiring measured data into the internal memory of a DL850E/DL850EV as *monitoring* (measurement) and the task of saving the measured data that has been acquired to the internal memory of a DL850E/DL850EV as files on your PC's hard disk or the internal hard disk of a DL850E/DL850EV while making measurements as *recording*.
The measured data acquired in the internal memory of a DL850E/DL850EV is cleared when the power is turned off and then turned back on or when measurement is resumed. The waveform window of this software displays waveforms of measured data acquired to the internal memory of a DL850E/DL850EV after applying P-P compression.



When a measurement is complete, the measured data acquired in the internal memory of a DL850E/DL850EV can be saved as a single file on your PC.
This is task is referred to as *saving*, not recording.

Connecting to a DL850E/DL850EV

The USB interface can be used to connect your PC directly to a DL850E/DL850EV, or the Ethernet interface can be used to connect to a DL850E/DL850EV over the network.
Only a single DL850E/DL850EV can be connected to a single PC.

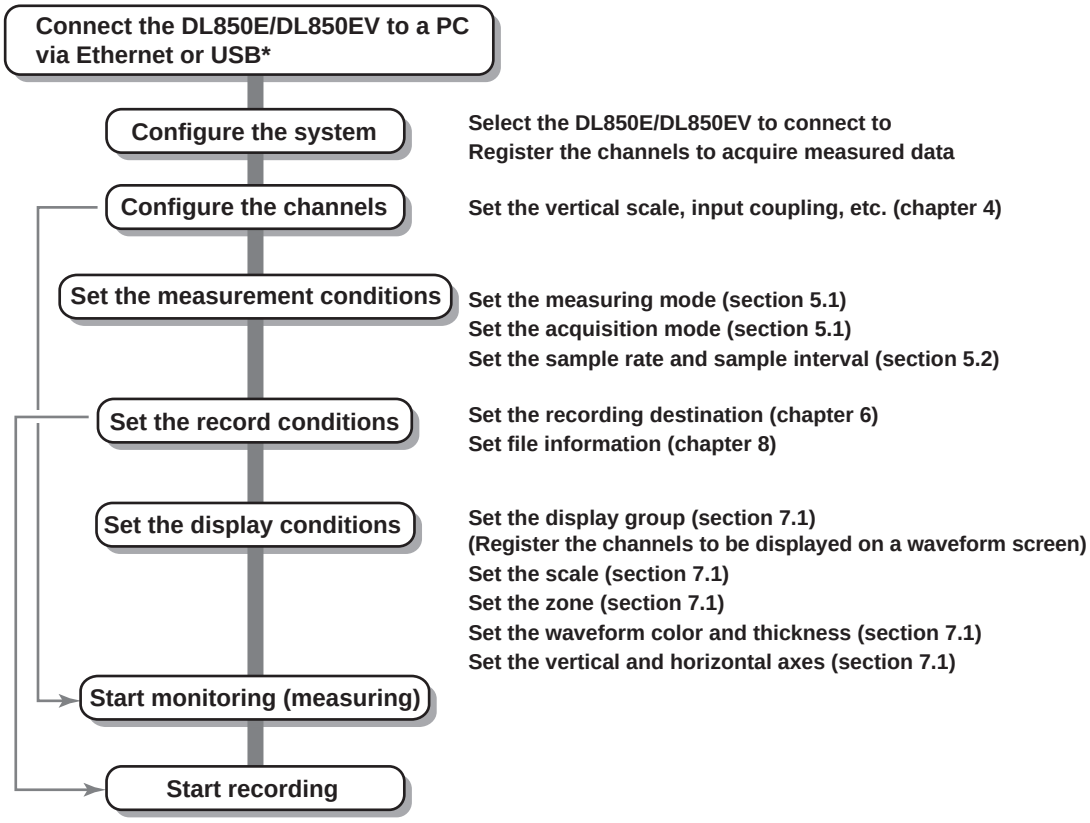
Note

- Before removing the USB or Ethernet cable that is connecting the DL850E/DL850EV to the PC, be sure to close the Acquisition Software or disconnect the communication between the DL850E/DL850EV and the PC.
- To connect through USB, you need a dedicated USB driver. For details, see section 2.3, "Installing the USB Driver."
- You cannot connect both Ethernet and USB interfaces simultaneously to a DL850E/DL850EV. Therefore, it is not possible to use FTP or other network connection programs over Ethernet to connect to a DL850E/DL850EV that this software is already connected to using USB.
- When connecting a DL850E/DL850EV to the PC, disable the PC standby mode. If it is enabled, the connection between the DL850E/DL850EV and the PC may be disconnected.
- If the network becomes unstable due to network applications or the like, the DL850E/DL850EV may not be able to record properly. If you want to record continuously for a long period of time, check that the network is capable of long-term stable communication in advance.
- You will not be able to connect if the DL850E/DL850EV is configured to reject connection requests from the Acquisition Software.

Workflow

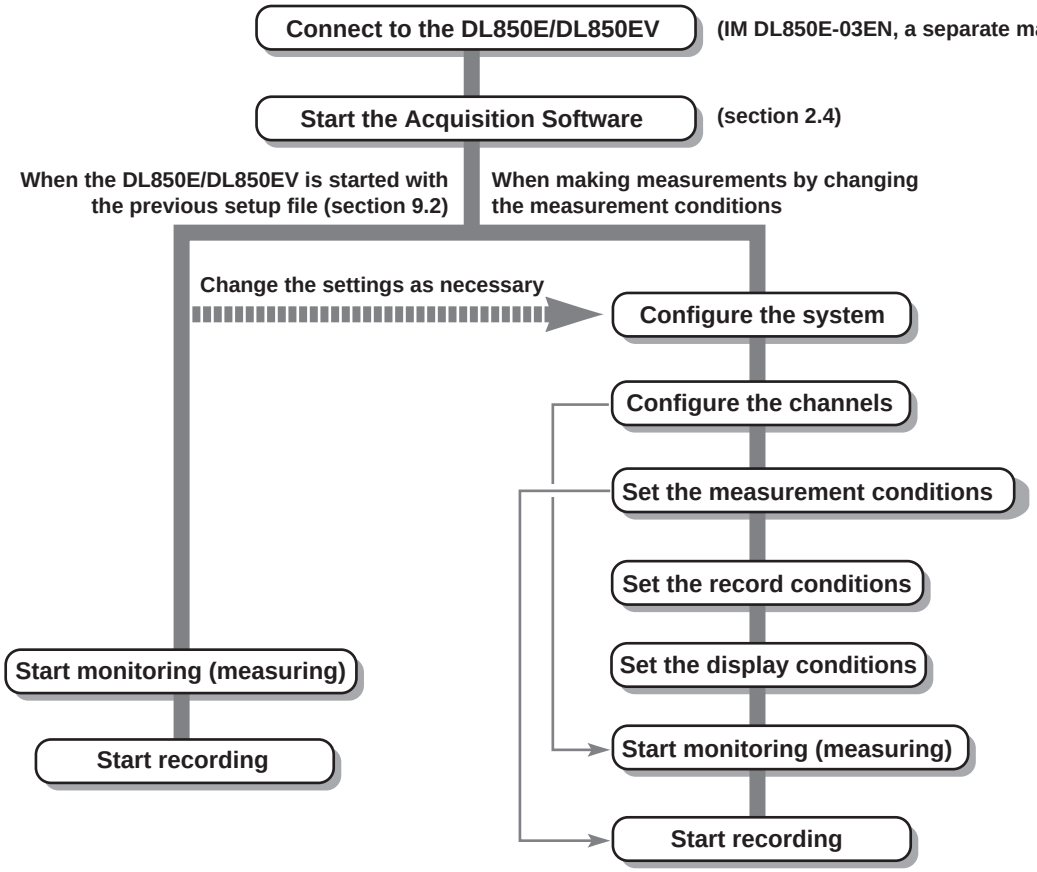
The workflow to make measurements using the Acquisition Software varies depending on whether it is the first time that you are connecting to the DL850E/DL850EV.

If Connecting to the DL850E/DL850EV for the First Time



*** To connect via USB, a USB driver must be installed.**

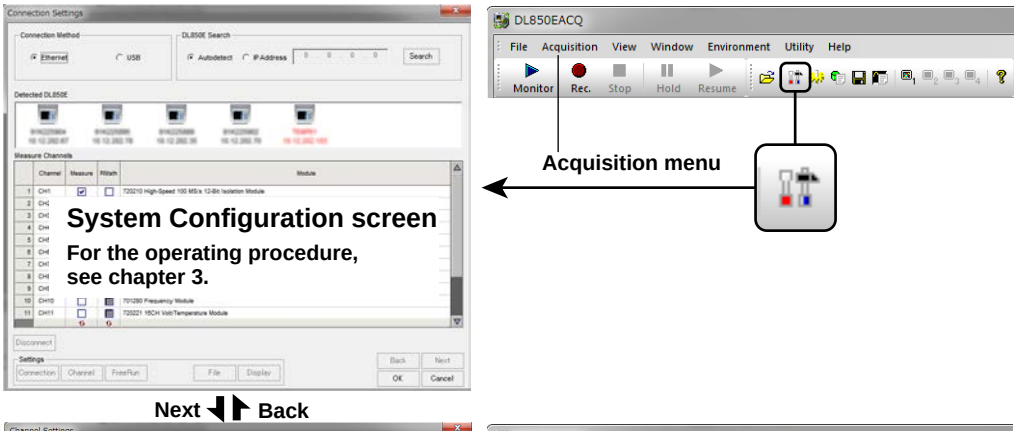
If Reconnecting to the DL850E/DL850EV



*** For details on each setup item, see the operation flow diagram "Connecting to the DL850E/DL850EV for the First Time."**

Setup in Wizard Format

The basic setup consisting of system configuration, channel settings, measurement (FreeRun) settings, recording (File) settings, and display settings can be specified easily using dialog boxes in wizard format. You can also use icons and the menu bar to specify system configuration, measurement settings, recording settings, and display settings individually.



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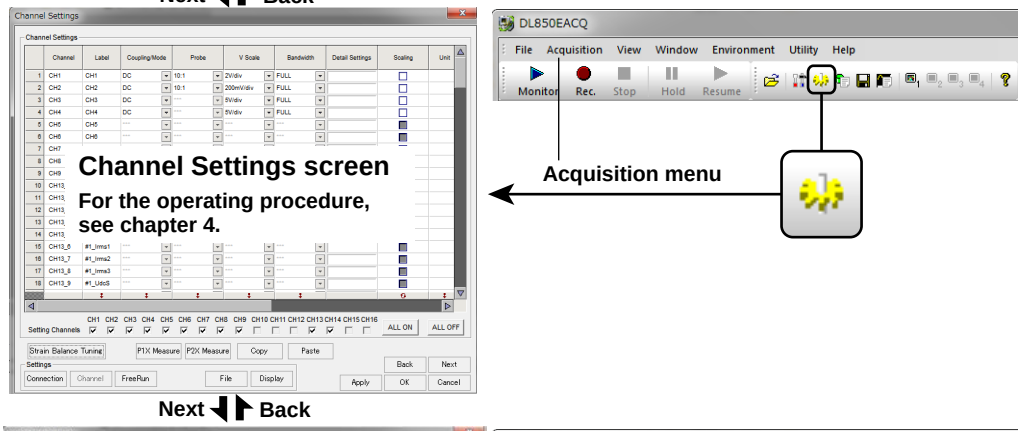

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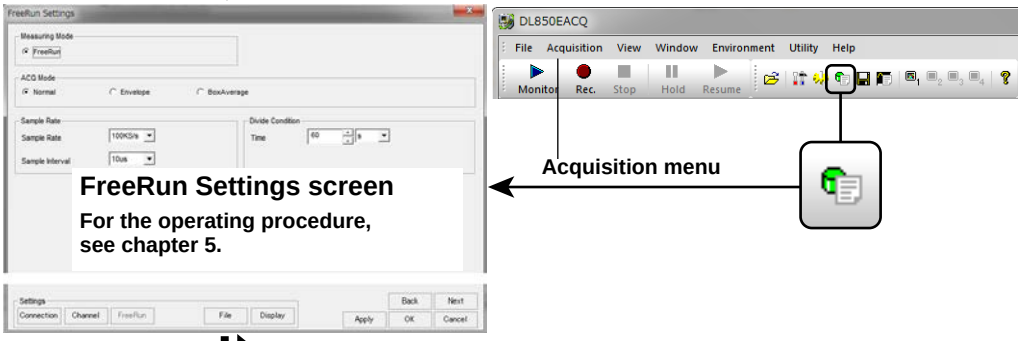

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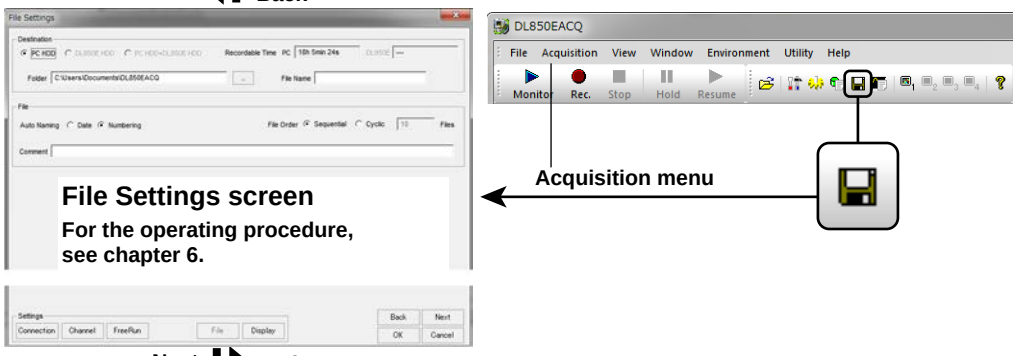

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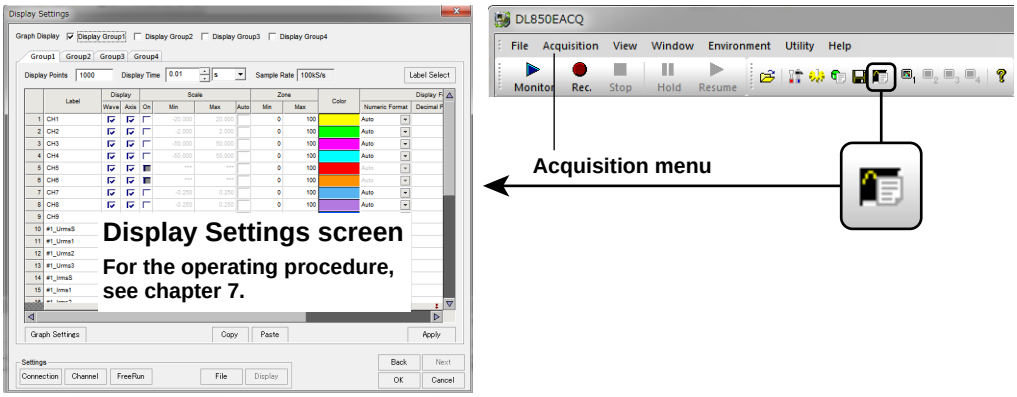

Display Settings screen
For the operating procedure, see chapter 7.
DL850EACQ
File
Acquisition
View
Window
Environment
Utility
Help
Monitor
Rec.
Stop
Hold
Resume
Acquisition menu

1.2 System Configuration

Communication Device

Select the interface to use to communicate with the DL850E/DL850EV: USB or Ethernet. The Acquisition Software can communicate with the DL850E/DL850EV that is connected to the interface you select.
The Ethernet interface can be used on a DL850E/DL850EV with the /C10 option.

Searching for the DL850E/DL850EV

You can search for the DL850E/DL850EV that is to communication with the PC.
For USB, all the DL850E/DL850EVs connected through USB can be searched.
For Ethernet, all the DL850E/DL850EVs connected to the network can be searched (auto search) or a specific IP address can be searched for.

Auto Search

All the DL850E/DL850EVs connected to the network are searched, and their serial numbers and IP addresses are displayed.

IP Address

You can search for a specific DL850E/DL850EV by specifying the IP address.

Measuring Source Channels

Select the channels to acquire measured data.

1.3 Channel Settings

This section explains settings that are specified for each measuring channel, such as input coupling, probe attenuation, and bandwidth limit.

Input Coupling

The following types of input coupling are available.

DC

The input signal is directly coupled to the attenuator of the vertical control circuit. Select DC if you want to measure the entire vertical input signal (DC and AC components).

AC (Only When Measuring the AC Voltage)

The input signal is coupled to the attenuator of the vertical control circuit through a capacitor. Select AC if you want to measure only the amplitude of the AC signal, eliminating the DC components from the input signal.

GND

The input signal is coupled to the ground, not to the attenuator of the vertical control circuit. Select GND to check the ground level on the window.

TC (Only When Measuring the Temperature)

Select TC if you are measuring the temperature using the 701261 (UNIVERSAL), 701262 (UNIVERSAL (AAF)), 701265 (TEMP/HPV), 720221 (16CH TEMP/VOLT), or 720266 (TEMP/HPV).

DC-RMS

Using the 701267 (HV (with RMS)) or 720268 (HV (with RMS/AAF)), both the DC and AC components of the input signal are converted to rms values and displayed. An RMS conversion circuit is connected to the vertical control circuit of the same input coupling circuit used when the coupling is set to DC.

AC-RMS

Using the 701267 (HV (with RMS)) or 720268 (HV (with RMS/AAF)), only the AC component of the input signal is converted to rms values and displayed. An RMS conversion circuit is connected to the vertical control circuit of the same input coupling circuit used when the coupling is set to AC.

ACCL (Only When Measuring Acceleration)

Select ACCL to measure acceleration using the 701275 (ACCL/VOLT).

Probe Attenuation and Current-to-Voltage Conversion Ratio

When using a probe, the attenuation setting on the DL850E/DL850EV must be set equal to the probe attenuation or current-to-voltage conversion ratio so that the measured voltage (current) can be read directly.

The DL850E/DL850EV has the following attenuation settings: 1:1, 10:1, 100:1, 1000:1, 1 A:1 V,[1] 10 A:1 V,[2] 100 A:1 V,[3] 400 A:1 V.[4] When using a probe, set the attenuation ratio on the DL850E/DL850EV according to the attenuation of the probe.

1 Output voltage rate: 1 V/A
2 Output voltage rate: 0.1 V/A
3 Output voltage rate: 0.01 V/A
4 Output voltage rate: 0.0025 V/A

Note

Use a probe that matches the input capacity of each module. Otherwise, the capacity cannot be adjusted.

Vertical Scale

Set the vertical scale (V/div) according to the input signal.
Select a TC type when measuring temperature.

Bandwidth Limit

You can set a upper bandwidth limit on the analog signal for each channel. This allows you to observe waveforms with noise components above the specified frequency removed.

Linear Scaling

The measured data can be scaled to any physical value and displayed.
When measuring the voltage (current), strain, or frequency (number of rotations, period, duty cycle, power supply frequency, pulse width, pulse integration, and velocity), there are two methods of linear scaling: “aX+b” and “P1-P2.”

aX+b

The results obtained from the following computation based on the specified scaling coefficient a and offset b are displayed as cursor measurement values and automated measurement values of waveform parameters.

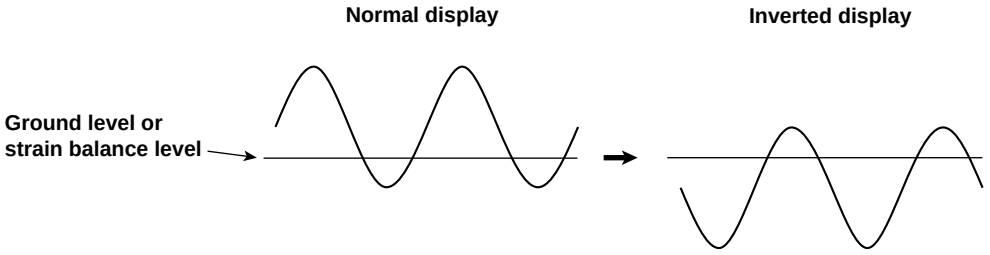
$Y = aX + b$

P1-P2

Specify arbitrary scale values (P1Y and P2Y) for the measured values of two arbitrary points (P1X and P2X). The scaling equation (y = ax + b) is derived from these four values.

Waveform Inversion

When measuring voltage or strain, the waveform can be displayed with the vertical axis inverted around the ground level or the strain balance level as shown below.



RMS Measurement

When a 701267 (HV (with RMS)) or 720268 (HV (with RMS/AAF) channel is selected, you can observe the RMS values of the input signal.

AC-RMS

This setting is used when you want to observe only the rms values of the AC signal, eliminating the DC components from the input signal.

DC-RMS

This setting is used when you want to observe the rms values of both the DC and AC components of the input signal.

Temperature Measurement

Thermocouple Type

The following types of thermocouples are available.
K, E, J, T, L, U, R, S, B, N, W, Au7Fe

Selectable Temperature Units

You can select °C or K.

Reference Junction Compensation (RJC)

The voltage generated by a thermocouple depends on the temperature of the point of measurement and the reference junction temperature. In this case, the function used to compensate the temperature on the measurement instrument to the cold junction is referred to as reference junction compensation.
You can turn ON/OFF the internal RJC circuit of the input module.

ON: Use this setting to enable the reference junction compensation by the internal RJC circuit.

OFF: Use this setting to check the temperature measurement value or to use an external reference junction (0°C).

Burnout

Specify the behavior when the thermocouple input detects a burnout.

ON: Fix the measured value to the upper limit of the measurement range of each thermocouple if a burnout is detected.

OFF: Not detect burnouts.

Strain Measurement

You can measure strain by connecting a strain gauge bridge (bridge head) or a strain gauge transducer to the Strain Module (701270 (STRAIN_NDIS) or 701271 (STRAIN_DSUB)).

Relationship between the Strain (μSTR) and the Transducer Output (mV/V)

The DL850E/DL850EV allows the unit to be changed between “the strain unit (μSTR: $\times 10^{-6}$ strain)” and “the output unit of the strain gauge transducer (mV/V).” The following relationship exists between μSTR and mV/V.

$(mV/V) = 0.5 \times (\mu STR)/1000$

Gauge Factor If mV/V Is Selected

You can set the gauge factor to any value on the DL850E/DL850EV. However, if there are no specifications on the strain gauge transducer, set K to 2.

If K is not 2, e is derived in the DL850E/DL850EV using the following equation.

$e = (4/K) \times (V/E)$

e: Measured value of the strain gauge transducer [mV/V]

V: Voltage measured on the bridge [V]

E: Voltage applied to the bridge [V]

K: Gauge factor

Acceleration Measurement

The Acceleration Module (with AAF) (701275 (ACCL/VOLT)) measures acceleration using the output signal from an acceleration sensor. Direction connection is possible to a built-in amplifier type acceleration sensor.

Filter

If you set the bandwidth limit to Auto, the anti-aliasing filter (AAF) and low-pass filter are enabled depending on the sample rate to eliminate high-frequency noise from the input signal.

Note

The filter is effective not only during acceleration measurement but also during voltage measurement.

Frequency Measurement

Measured Item

The Frequency Module (701281 (FREQ) or 720281 (FREQ)) measures frequency, number of rotations, period, duty cycle, power supply frequency, pulse width, pulse integration, and velocity.

Decelerating Prediction and Stop Prediction

The 701281 (FREQ) or 720281 (FREQ) automatically performs internal computation and displays waveforms by predicting the deceleration curve and stop point even when the input pulse is suddenly cut off.

Decelerating Prediction

The deceleration curve is computed according to the following equation using the elapsed time after the pulse input stops (Δt).

Frequency (f) = 1/period (Δt)

Stop Prediction

The function determines the stop point at a constant time after the pulse input stops, and the frequency is set to 0.

Filter

Smoothing filter (moving average)

The frequency module can display waveforms by taking the moving average of the data in real-time.

Pulse Average

Measures the input pulse by dividing the pulse by the specified number of pulses (1 to 4096 pulses).

Offset Function

The 701281 (FREQ) or 720281 (FREQ) allows you to set the center of observation (offset value) and expand the area around the offset value for close observation.

Power Supply Analysis, CAN Bus Signal Measurement, LIN Bus Signal Measurement, SENT Signal Measurement

This software cannot be used to configure power supply analysis. Nor can it be used to configure CAN bus signal measurement, LIN bus signal measurement, or SENT signal measurment using CAN bus Monitor Modules (720240), CAN & LIN Bus Monitor Modules (720241), CAN/CAN FD Monitor Modules (720242), or SENT Monitor Modules (720243). Configure them from the DL850E/DL850EV. YOKOGAWA's free software Symbol Editor is convenient for setting CAN bus or LIN bus signals. You can download Symbol Editor from YOKOGAWA website. You can download Symbol Editor from YOKOGAWA website.

1.4 Measurement Conditions (FreeRun Settings)

This section briefly explains the DL850E/DL850EV measurement conditions that can be specified using this software. For details, see the DL850E/DL850EV User's Manual, IM DL850E-01EN, (pdf file).

Measuring Mode

The only available measuring mode is free run.

Free Run Mode

In free run mode, data is acquired immediately when measurement is started. Data acquisition continues until measurement is stopped.

Acquisition Mode

When acquiring measured data in the internal memory of the DL850E/DL850EV, it is possible to perform processing on data and display waveforms based on the processed data. The following three types of data processing are available.

Normal Mode

In this mode, measured data is acquired without special processing.

Envelope Mode

The DL850E/DL850EV determines the maximum and minimum values among the data sampled at the maximum sample rate for each module at a time interval that is twice the sampling period (the inverse of the sample rate) of Normal mode, saves the values as pairs in the acquisition memory, and uses the saved value pairs to display the waveforms.

Box Average Mode

This mode is available on the 701250 (HS10M12), 701255 (NONISO_10M12), 720210 (HS100M12), 720211 (HS100M12) and 720250 (HS10M12). In this mode, the DL850E/DL850EV determines the moving average of the data sampled at the maximum sample rate and acquires and displays the resultant data.

Sample Rate and Sample Interval

You can set the sample rate or sample interval.

The sample rate (the number of samples per second in unit of S/s) is related to the sample interval as follows:

Sample Rate = 1/sample Interval

Sample rate = 1/sample interval If you set a sample rate that exceeds the maximum sample rate of a module, data cannot be acquired at the specified sample rate. The data at times when data cannot be acquired is set to the same value as the previous acquired data.

The maximum sample rate varies depending on number of measuring channels.

No. of Measuring Channels*	Maximum Sample Rate
1	1 MS/s
2 or 3	500 kS/s
4 to 8	200 kS/s
9 to 16	100 kS/s

* Measuring channels do not include sub channels.

Division Conditions

Measured data file that is recorded from when recording is started until recording is stopped is divided at specified time intervals and saved.

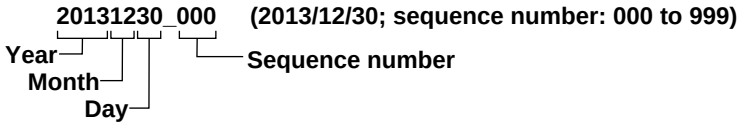
1.5 Recording Conditions (File Settings)

Auto Recording Destination

Measured data is recorded to the specified hard disk.
The following three recording destinations are available.

- PC HDD: Records on the hard disk of the PC in which this software is installed.
- DL850E HDD: Records on the DL850E/DL850EV hard disk. You cannot specify this setting on a DL850E/DL850EV without a hard disk.
- PC HDD +DL850E HDD:
  Records both on the PC and DL850E/DL850EV hard disks. You cannot specify this setting on a DL850E/DL850EV without a hard disk.

The remaining space on the PC or DL850E/DL850EV hard disk can be displayed on the window.
When recording on a PC hard disk, you can specify the save destination folder. A folder with the following name is created in the specified folder, and data is save in the folder.



Starting and Stopping Recording

To start recording, click the Start Recording button or Start Recording on the Acquisition menu.
To stop recording, click the Stop button or Stop Recording on the Acquisition menu.

Note

The recordable time varies depending on the following conditions.

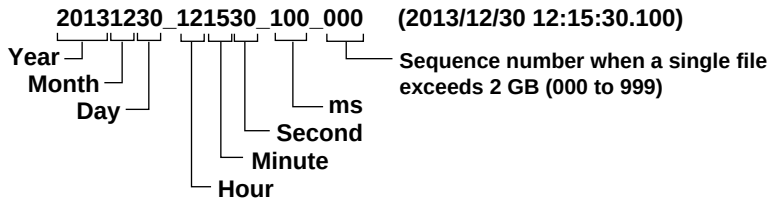
- The amount of free space on the recording destination hard disk
- The number of measuring channels
- The sample rate

File Name

To Use the Date/Time in the File Name

The date/time (ms unit) of the recording is used for the file name. A specific file name cannot be specified.

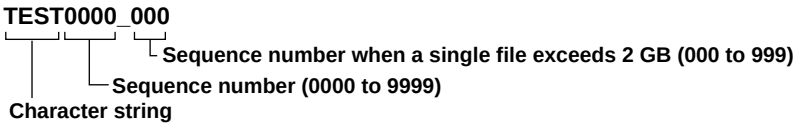
In Free Run Mode



To Use a Sequence Number in the File Name

A sequence number is added to a file name that you specify.

In Free Run Mode



File Order

There are two methods for recording measured data to the hard disk of your PC or the DL850E/DL850EV: sequential and cyclic.

Sequential

Records the files sequentially to the hard disk. This method is useful if you want to retain the old data. If the number of recordings is large, the free space on the hard disk may run out.

Cyclic

Records the specified number of files. If the specified number is exceeded, the file is overwritten in order from the oldest one. This method is useful if the free space on the hard disk is low.

1.6 Display Settings

Display Group

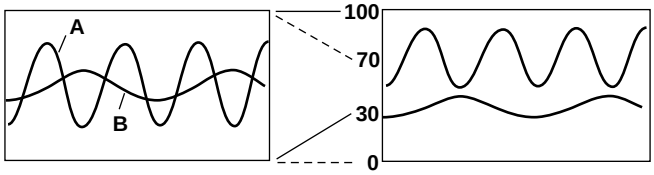
The measured data on measuring channels that are enabled in the system configuration can be divided and displayed in four groups (display group 1 to 4). Up to 32 channels can be registered in a group. The same channel can also be registered to multiple groups.
The measured data of channels in the same group (display group 1) can be compared using cursor values and values obtained through automated measurement of waveform parameters.

Scale

You can set the display range. If linear scaling is set on the channel, the range is specified using a scaled value.
It is also possible to automatically set a scale based on the measured data.

Zone

You can set the position to display the waveform.
The display position is set in terms of a percentage of the window.
This feature keeps waveforms from overlapping when displaying multiple waveforms on a single window.
The following example shows the case when the display zone of waveform A is set to 30% to 100% and that of waveform B is set to 0% to 70%.



Displays Other Than Waveforms

Current Value Display

The current measured value is displayed using a bar graph, digital display (numeric), analog meter, or thermometer.
Current values are measured data that this software retrieves from the DL850E/DL850EV at 100-ms intervals.

Numeric Value Display

Displays the measured values at the cursor positions.

1.7 Analysis Function

Cursor Measurement

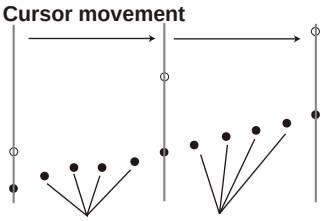
There are two types of cursors: horizontal and vertical. Two cursors are displayed for each type of cursor. The measured values at the two cursor positions and the difference between the cursors can be displayed.

You can move the cursor directly by dragging it or by using the left, right, up, and down arrow keys on the keyboard. If you are dragging the cursor, the cursor moves in steps of screen dots.

If you are using the left, right, up, and down arrow keys, the vertical cursor moves over the measured data. The speed at which the cursor moves varies depending on the number of measured data points displayed on the screen. If the number of measured data points is greater than the number of dots on the waveform window, the cursor moves on all the measured data points that are displayed at the dot before moving to the next dot. Therefore, the cursor will move slower.

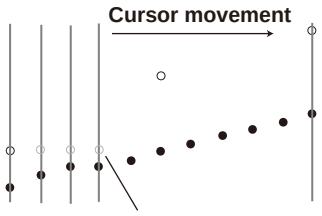
If multiple waveforms with different sample rates are displayed on the same window, the cursor moves according to the sample rate of the cursor target waveform.

For waveforms with low sample rate



Measured value that cannot be read with cursors

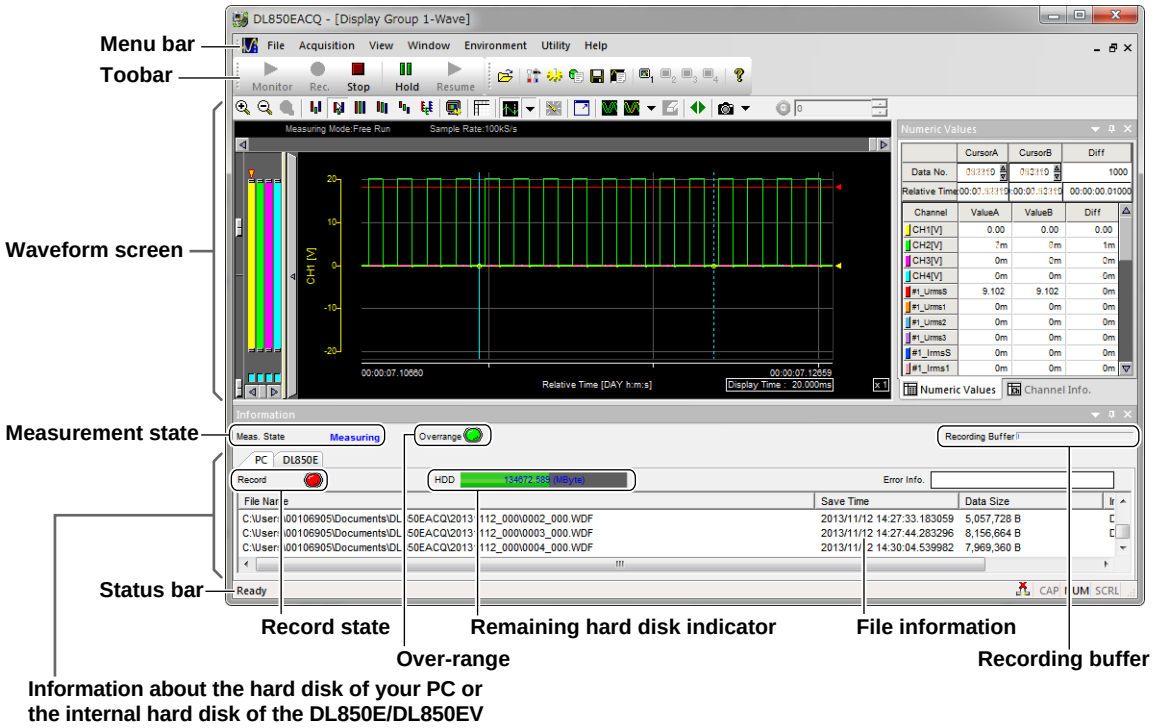
For waveforms with high sample rate



Displays the same value as the previous measured value because there is no measured data

1.8 Window Description

Main Window



Information about the Hard Disk of Your PC or the Internal Hard Disk of the DL850E/DL850EV

Displays information about the hard disk of your PC or the internal hard disk of the DL850E/DL850EV. You can switch the displayed hard disk using tabs.

File Information

Displays the file name, save time, data size, and the like of the measured data or setup data that are saved.

Record State

The lamp is red while recording to the hard disk.

Remaining Hard Disk Indicator

Displays the remaining hard disk space in megabytes (MByte). If the remaining space falls low, the bar turns red.

Measurement State

Displays the current measurement state.

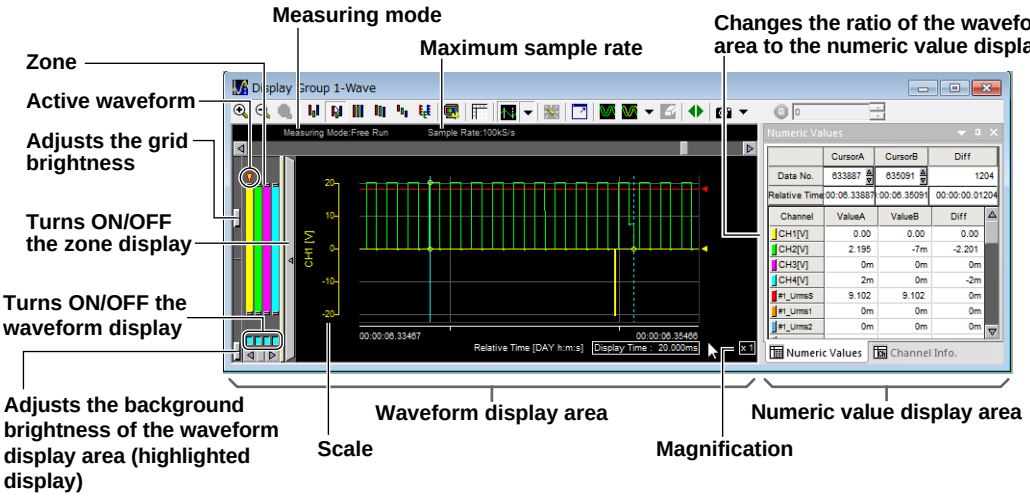
Recording Buffer

Displays a bar that indicates buffer usage. The closer the recording buffer usage gets to overrunning the buffer, the longer the blue bar becomes. For example, this situation occurs when recording cannot keep up with the measured data.

Over-Range

Turns red when an over-range occurs. Double-click to display an over-range list screen showing a list of channels that over-range is occurring on.

Waveform Window



Active Waveform

The waveform with a triangle mark is the active waveform.

Scale

Displays the scale according to the display settings. If zones are specified with overlapping scales, the scale of the active waveform is displayed.

Measuring Mode

Displays “Free Run.”

Sample Rate

Displays the sample rate of the displayed waveform.

Adjusting the Brightness of the Grid (Graticule)

Drag the knob to change the brightness of the grid.

Adjusting the Background Brightness of the Waveform Display Area (Highlighted Display)

Slide the knob to change the background of the waveform display from black to white in steps.

Turning ON/OFF the Waveform Display

Click this area to turn the channel display on and off. Channels that are displayed are indicated in light blue.

Turning ON/OFF the Zone Display (Sliding Window)

Move the pointer over this area and click when this area changes to light purple to turn the zone display area on and off.

Main Waveform or Zoom Waveform

The displayed waveform is indicated by the blue frame.

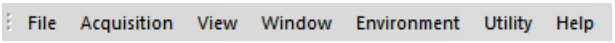
Changing the Ratio of the Waveform Display Area to the Cursor Value Display Area

Drag when the pointer changes to a left-right arrow to change the ratio of the display areas.

Time Display

In Free Run mode, the displayed time range is displayed along with the elapsed time.

Menu Bar



File Menu

A menu used to save and load setup files, to save image data, and so on.

Acquisition Menu

A menu used to (1) specify system configuration, channel settings, measurement settings, recording settings, and display settings, (2) start and stop monitoring (measurement), (3) start and stop, and (4) hold and resume the display.

View Menu

A menu used to (1) show and hide operating information, (2) set waveform zooming, display zones, measured value display, (3) show and hide current values, full-screen display, toolbar, and status bar.

Window Menu

A menu used to set the waveform window. This menu appears when the waveform window is displayed.

Environment Menu

A menu used to enter environment settings, enable and disable the key lock on the DL850E/DL850EV, and calibrate the DL850E/DL850EV.

Utility Menu

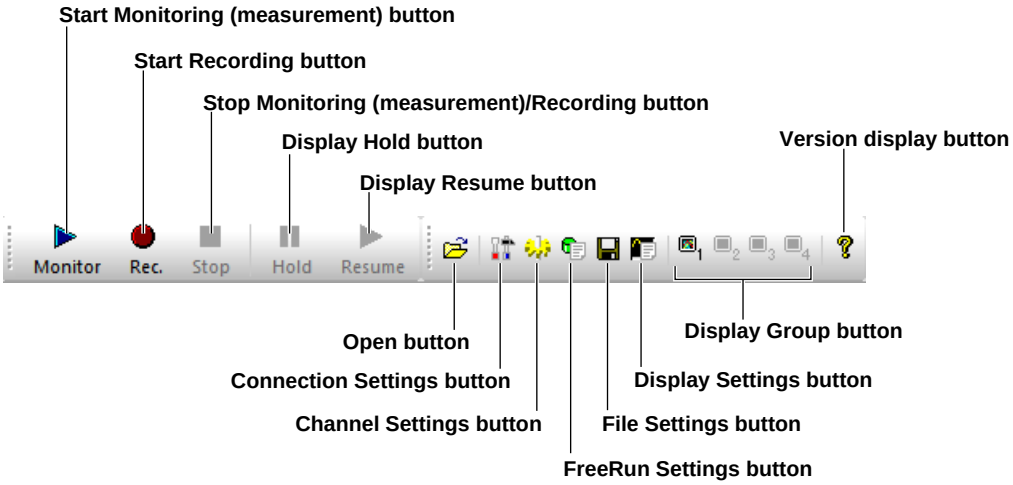
A menu used to start Xviewer (sold separately) and File Utility.

Help Menu

A menu used to display help and software version.

Toolbar

Click the buttons on the toolbar to execute a certain operation or display a setup menu.



1.9 Other Features

Saving the Setup File

The setup entered using this software can be saved.

Accumulating Waveforms

You can accumulate waveforms on the window, retaining the old waveforms. This is useful when you want to observe fluctuations in the measured data.

Taking Snapshots

You can change the display color of the waveforms that you want to keep on the window and retain just those waveforms. This is useful when you want to compare waveforms.

Automatically Displaying Waveforms from Memory

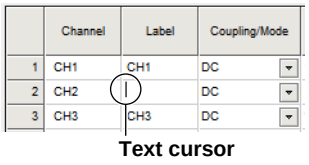
You can set the DL850E/DL850EV to automatically display the measured data in its acquisition memory.

1.10 Basic Operation

This section explains the basic operation of this software.

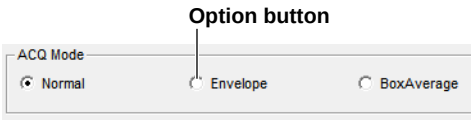
Text Box

You can directly type a value or text. Click the box to show the text cursor or highlight an existing value and type from your keyboard.



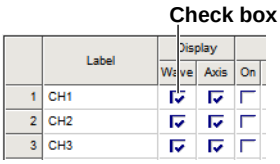
Option Button

You can select one of the option buttons.



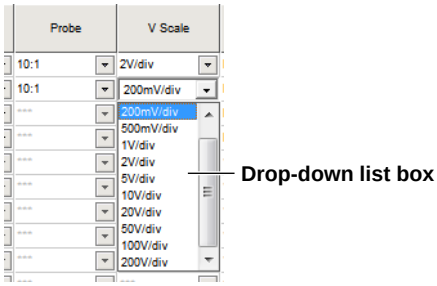
Check Box

You can select multiple items from the available items. Clicking a selected check box clears it.



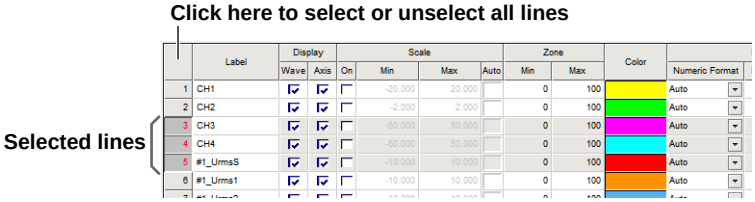
Drop-Down List Box

Click by the ▼ box to display a list of available choices.



Selecting Lines

To select a line on a setup window displayed in table format, click the beginning of the line. To select all lines, click the upper left corner of the table. To select consecutive lines, click the first line you want to select and press the last line while holding down the Shift key.

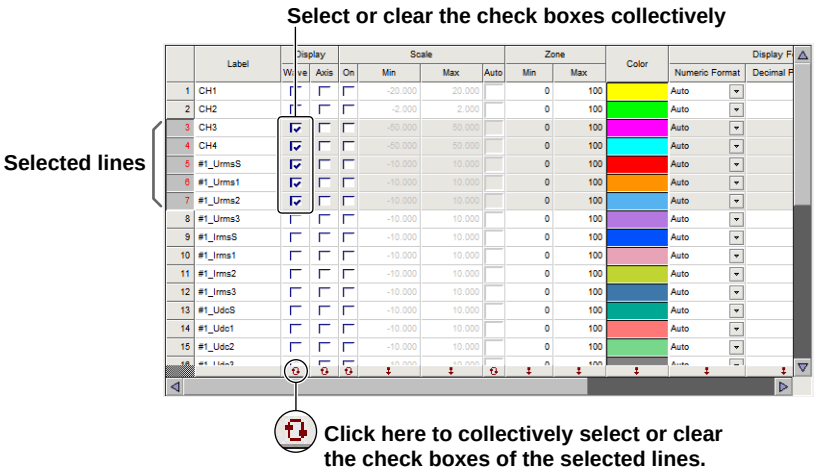


Collectively Selecting or Clearing the Check Boxes of the Selected Items

On a setup window displayed in table format, you can collectively select or clear the check boxes in a selected range.

Select multiple lines containing the check boxes you want to manipulate as described earlier.

Click ⇳ at the bottom of the check box items to collectively select or clear the check boxes in the selected range.

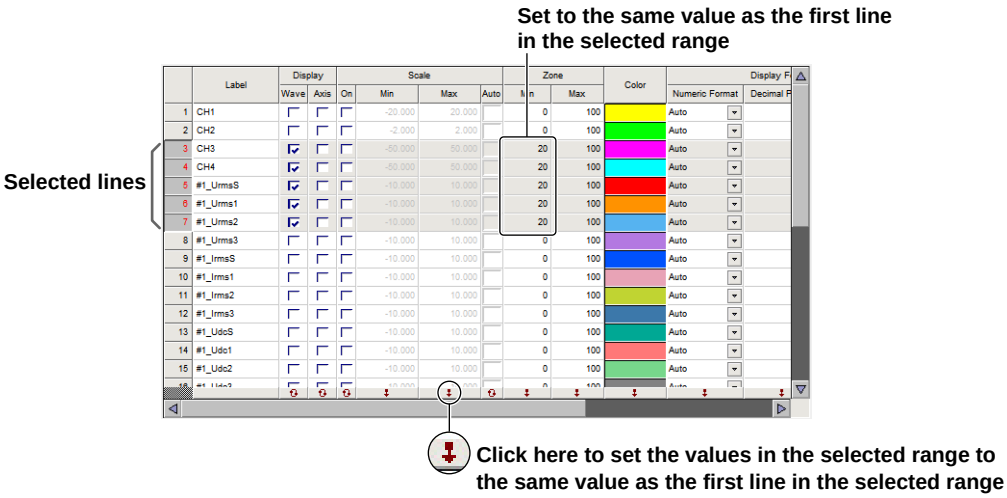


Setting the Value of the First Line in the Selected Range to the Other Lines in the Selected Range

On a setup window displayed in table format, you can set the values in the selected range to the same value as the value of the first line in the selected range.

Select multiple lines containing the check boxes you want to manipulate as described earlier.

Click ⇩ at the bottom of the items. The values in the selected range are set to the value of the first line in the selected range.



2.1 PC System Requirements

Install this software on a PC with the following specifications.

Operating System

Windows 7 (32-bit/64-bit), Windows 8 (32-bit/64-bit), Windows 8.1 (32-bit/64-bit), or Windows 10 (32-bit/64-bit)

CPU

Core2 Duo 2 GHz or better

Memory

At least 1 GB (at least 2 GB recommended)

Hard Disk

At least 2 GB of free space (before installation)
At least 100 GB recommended when using the auto recording function.

Communication Interface

USB2.0
Ethernet 1000BASE-T

CD-ROM Drive

A CD-ROM drive is required to install this software program.

CRT and Mouse

Display: XGA or better
Color: 65536 colors or better
The mouse must be compatible with Windows 7 (32-bit/64-bit), Windows 8 (32-bit/64-bit), Windows 8.1 (32-bit/64-bit), or Windows 10 (32-bit/64-bit).

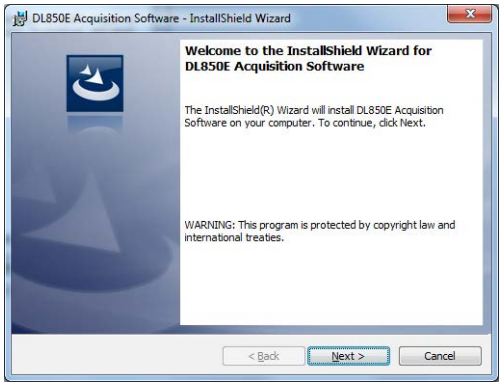
2.2 Installing or Uninstalling the Acquisition Software

Installing the Acquisition Software

The following procedure explains how to install the software on Windows 7.

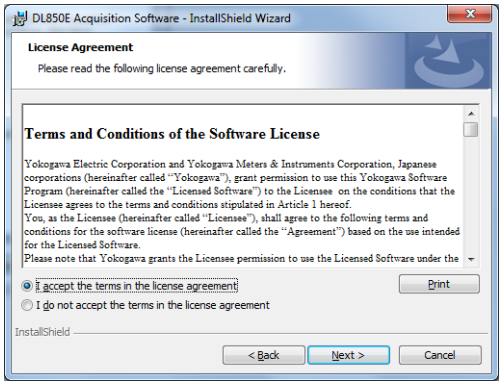
1. Start Windows and log on with administrator privileges.
2. Load the Acquisition Software installation disk into the CD-ROM drive.
   The installer starts automatically, and setup begins.
3. The installation wizard window appears.

   Click **Next**.

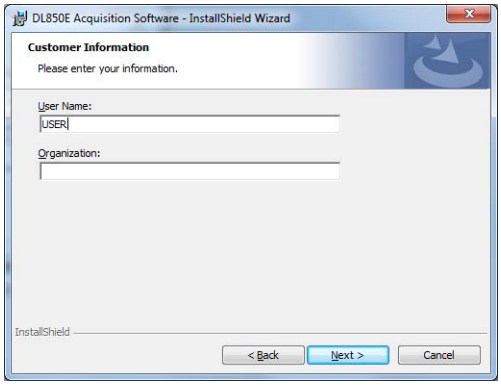


4. A software licensing agreement appears. Review the licensing agreement, and click “I accept the terms in the license agreement,” and then click **Next**.

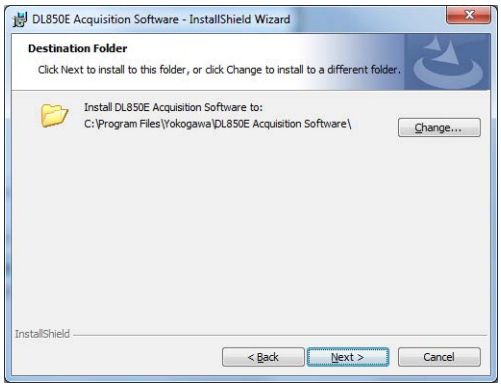
   If you click “I do not accept the terms in the license agreement,” you will not be able to install the software.



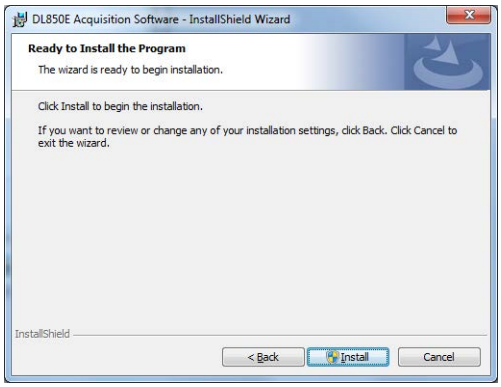
5. User information registration window appears. Enter the user name and affiliation, and click **Next**.



6. A window for setting the installation destination appears. The default settings is C\Program Files\Yokogawa\DL850E Acquisition Software. To change the destination, click **Change** and select the desired directory. Check the installation destination and click **Next**.

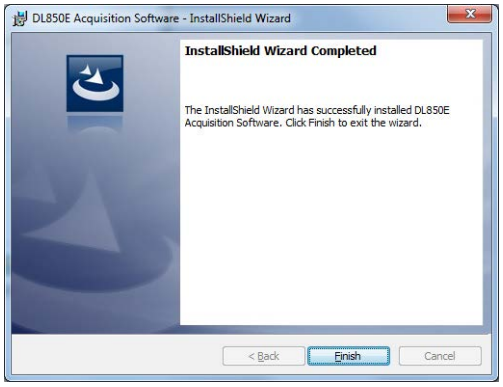


7. A window prompting you to start the installation appears. If there is no problem with the installation settings, click **Install**.



8. The software installation starts. When the software installation finishes normally, the following window appears.

   Click **Finish**.



   You are finished with the installation. Yokogawa > DL850EACQ is added to Start > Programs. A shortcut is also added to the desktop.

Uninstalling the Acquisition Software

This section explains how to uninstall the software on Windows 7.

1. On the Windows Start menu, click **Control Panel**.
2. Double-click **Programs and Features** in the Control Panel.
3. Select DL850EACQ, and click **Uninstall**.
4. A uninstallation confirmation window appears. To uninstall, click **Yes**. Click **No** to cancel the uninstallation.
5. The software is uninstalled.

2.3 Installing the USB Driver

A dedicated USB driver (YKMUSB) or IVI driver (VISA) is necessary to connect the DL850E/DL850EV to your PC using the USB.
The dedicated USB driver (YKMUSB) is provided in the Acquisition Software CD.
For the installation procedure, see the manual in the CD.
The dedicated USB driver (YKMUSB) is in the “\YKMUSB” folder.

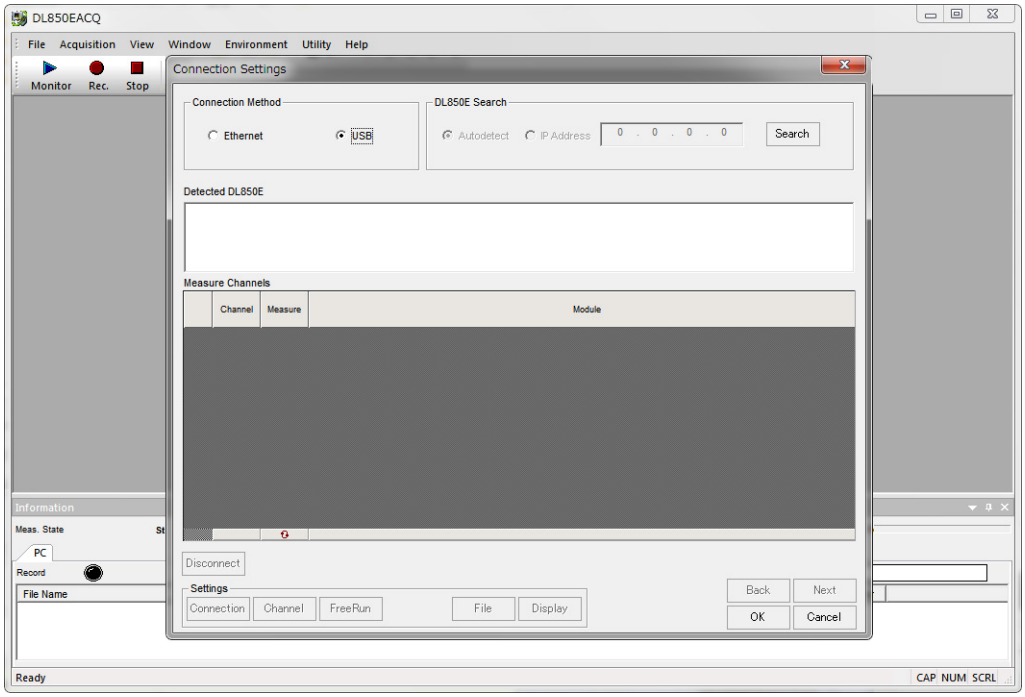
2.4 Starting and Exiting the Acquisition Software

Starting the Software

Double-click the DL850EACQ icon on the desktop.
The Acquisition Software starts.

Start-up Operation

The System Configuration window appears.



If you selected the Previous Settings check box in Environment Settings the last time you used the Acquisition Software, the software starts with the previous settings (see section 9.2). If the module configuration is different from the previous time or if the settings cannot be updated using the same conditions, the following message appears.
The same applies if you load the settings from a previously saved setup file and the settings of the software and the DL850E/DL850EV are updated.

Messages and Their Descriptions

The messages that may appear at start-up are described below.

Message	Description
Cannot find DL850E/DL850EV.	DL850E/DL850EVs cannot be detected using the search conditions used the last time the software was exited or the search conditions of the setup file. Below are some possible reasons. • The communication cable is disconnected. • If the connection method is Ethernet, the specified TCP/IP address and the TCP/IP address of the DL850E/DL850EV are different.
The connected DL850E is being remotely controlled by another application. Close the other application and connect to the DL850E again.	This software cannot connect because the DL850E/DL850EV is being controlled from another PC.

Message	Description
Configuration of the system are different.	The system configuration that existed when the software was exited the last time or that of the setup file is different from that of the connected DL850E/DL850EV. If you change, add, or remove the modules installed in the DL850E/DL850EV, the software considers the system configuration to be different.
To execute this operation, stop measurement first.	The connected DL850E/DL850EV is measuring.
Turn OFF HD Recording before Connecting the DL850E.	The connected DL850E/DL850EV is performing hard disk recording.
Current Firm Version is not supported, you will not be able to connect.	Appears when the Acquisition Software version is incompatible with the DL850E firmware. Update the Acquisition Software or the DL850E firmware. (See the software and DL850E/DL850EV firmware version compatibility table.)

- **Software and DL850E/DL850EV firmware version compatibility table**

Software version of this software	DL850E/DL850EV firmware version
1.01 to 1.03	3.00 or later but earlier than 3.20
1.04	3.20 or later but earlier than 4.00
1.05 to 1.08	4.00 or later but earlier than 4.20
1.09 or later	4.20 or later

Downloading the latest version:
http://tmi.yokogawa.com/products/data-acquisition-equipment/scopecorders/dl850edl850ev-scopecorder/

Corrective Action

The corrective action that is displayed along with the message is described below.

Corrective Action	Description
Get settings from the DL850E.	Discard the settings that were loaded and receive the settings from the DL850E/DL850EV. The measurement or recording on the DL850E/DL850EV continues.
Stopping measurement and sending settings to the DL850E.	If the DL850E/DL850EV is measuring, the settings cannot be updated. Stop the measurement and update the DL850E/DL850EV settings using the settings of this software.

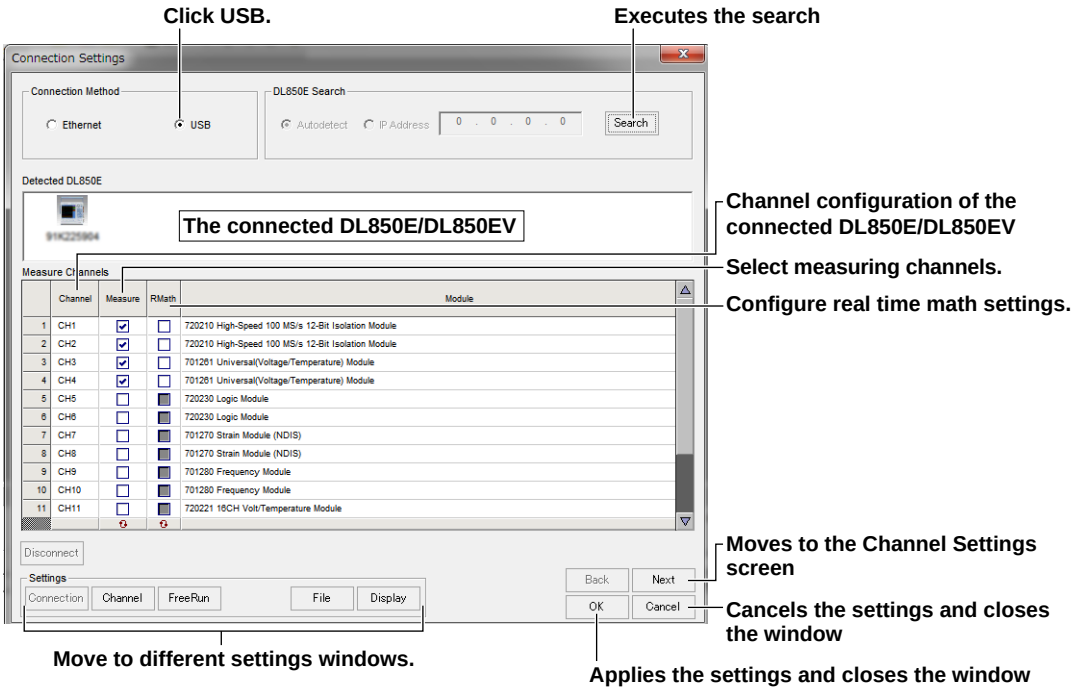
Exiting the Software

On the **File** menu, click **Exit**. The setup data is automatically saved.

3.1 Connecting Using the USB

Connect the USB port for PCs of the DL850E/DL850EV to your PC using a USB cable.
If you are connecting the DL850E/DL850EV to your PC for the first time after purchase, you must install the USB driver. Install the USB driver in your PC by following the instructions given in section 2.3, “Installing the USB Driver.”

1. Start the software.
   The System Configuration window appears.
   If the Previous Settings check box in Environment Settings is selected, the main window appears. If this happens, display the System Configuration window from the Acquisition menu.
2. Set the connection method to **USB**.
3. Click **Search**.
   The channel configuration of the connected DL850E/DL850EV is displayed.



4. Select the channels you want to measure.
5. Moving to another setting window or clicking **OK** will establish a connection with the selected DL850E/DL850EV.

Note

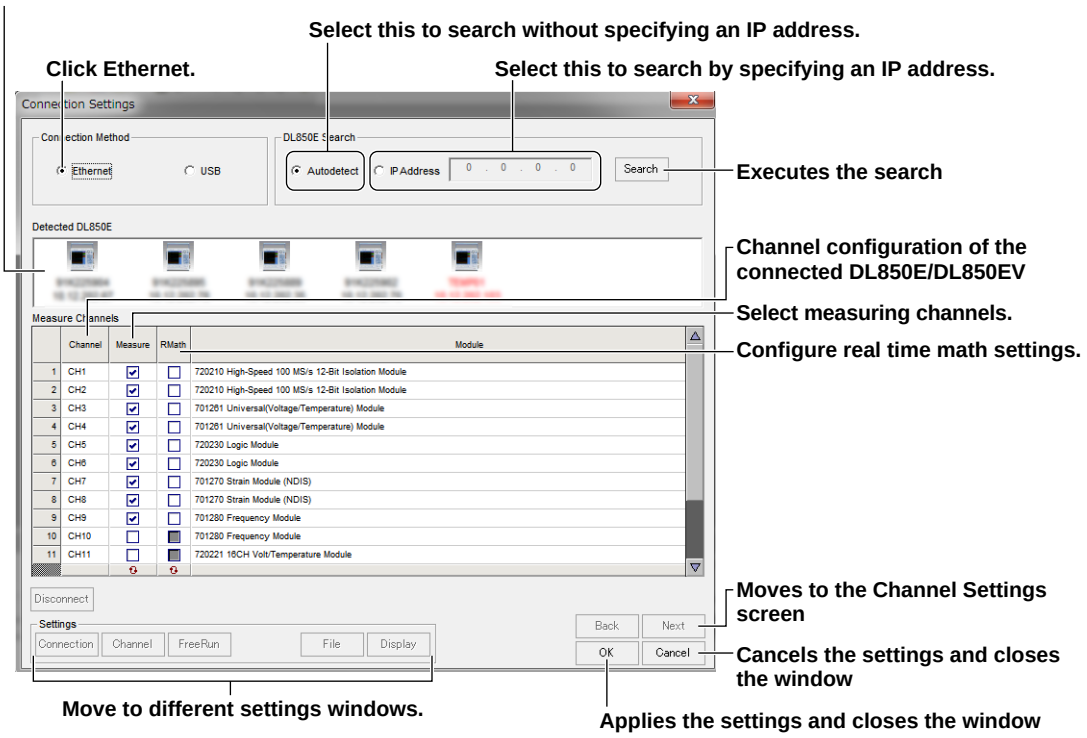
- If the channel configuration of the DL850E/DL850EV does not appear, the connection may have failed. Check the USB cable connection, and search again.
- For details on real-time math, see the DL850E/DL850EV User’s Manual.

3.2 Connecting Using the Ethernet

Connect the DL850E/DL850EV to a PC over an Ethernet network.

1. Start the software.
   The System Configuration window appears.
   If the Previous Settings check box in Environment Settings is selected, the main window appears. If this happens, display the System Configuration window from the Acquisition menu.
2. Set Connection Method to **Ethernet**.
3. Select **Autodetect** or **IP**. If you select IP, enter the IP address of the DL850E/DL850EV you want to connect to. Click **Search**.
   If you select Autodetect, the DL850E/DL850EVs connected to the network are displayed.
   If you specified an IP address, the specified DL850E/DL850EV is searched for.
4. From the displayed DL850E/DL850EVs, select the DL850E/DL850EV you want to connect to.
   The channel configuration is displayed.

The serial numbers and IP addresses of the detected DL850E/DL850EVs
The DL850E/DL850EV shown in red is connected to another PC.



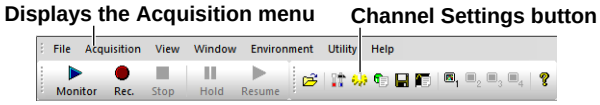
5. Select the channels you want to measure.
6. Moving to another setting window or clicking **OK** will establish a connection with the selected DL850E/DL850EV.

Note

- If the channel configuration of the DL850E/DL850EV does not appear, the connection may have failed. Check the Ethernet cable connection, and search again.
- To connect using Ethernet, you must set the IP address and other parameters of the DL850E/DL850EV in advance.
- For details on real-time math, see the DL850E/DL850EV User's Manual.

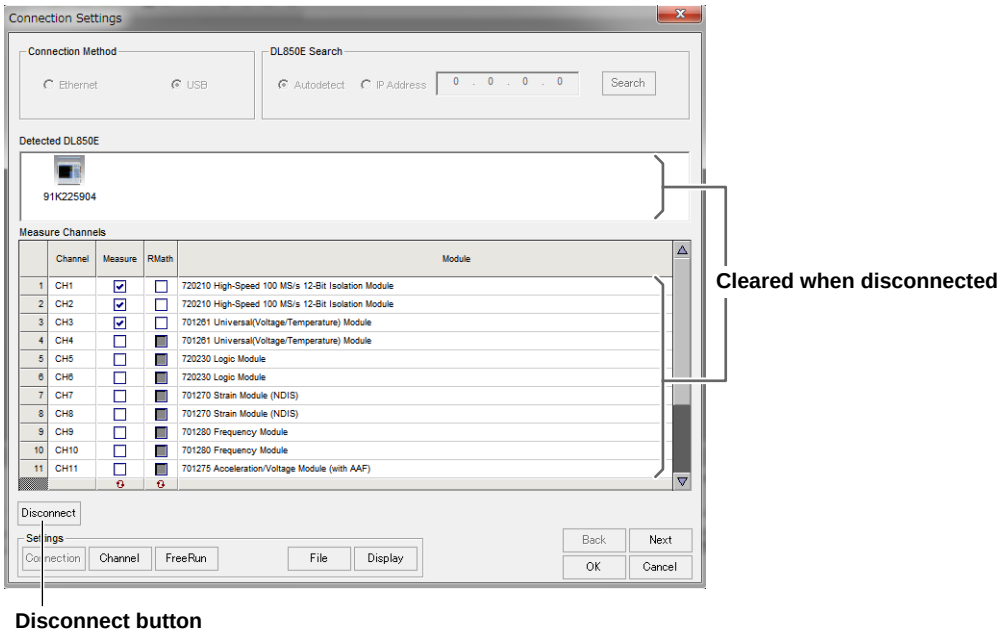
3.3 Changing the Connected Device

1. Click the **System Configuration button**, or click **System Configuration** on the Acquisition menu.



The System Configuration window appears.

2. Click **Disconnect** to disconnect the DL850E/DL850EV. The detected unit area and channel configuration area of the System Configuration window are cleared.

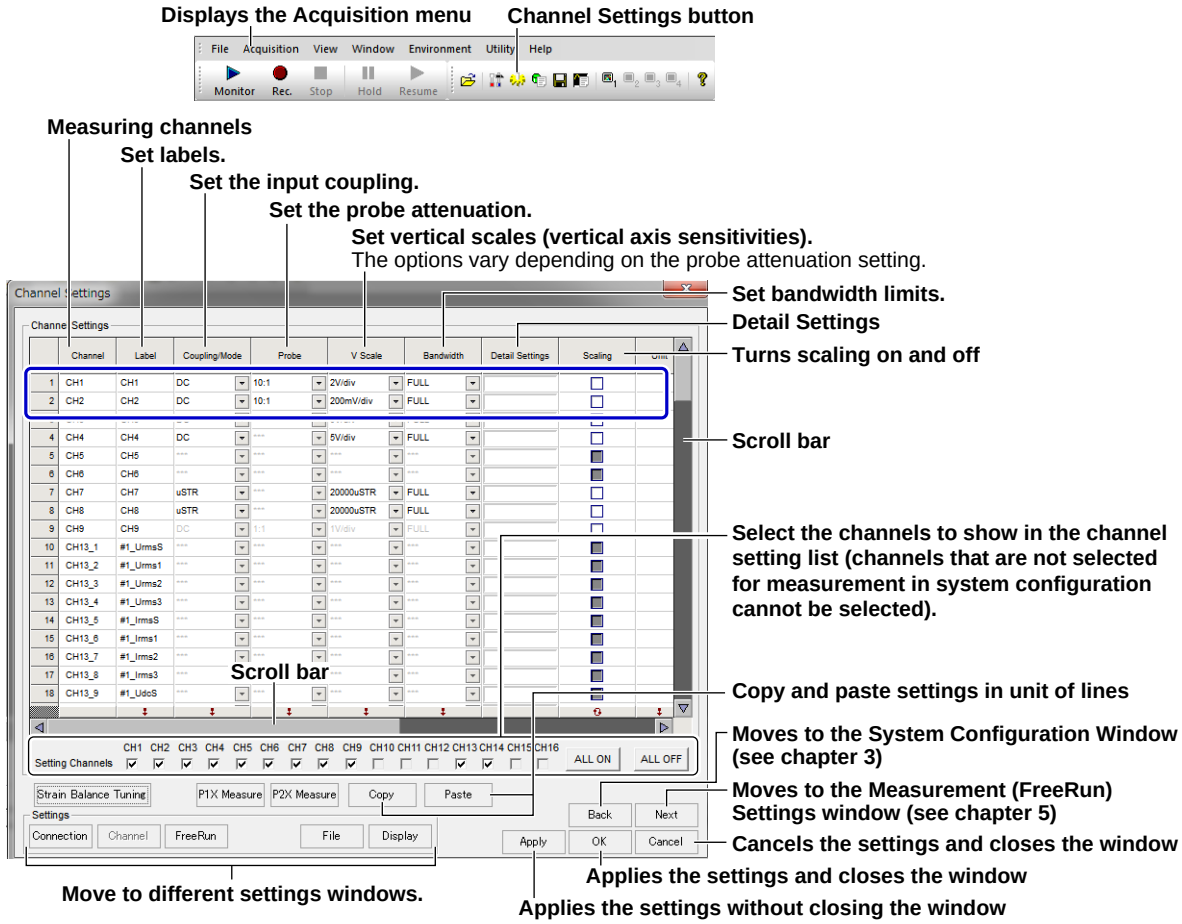


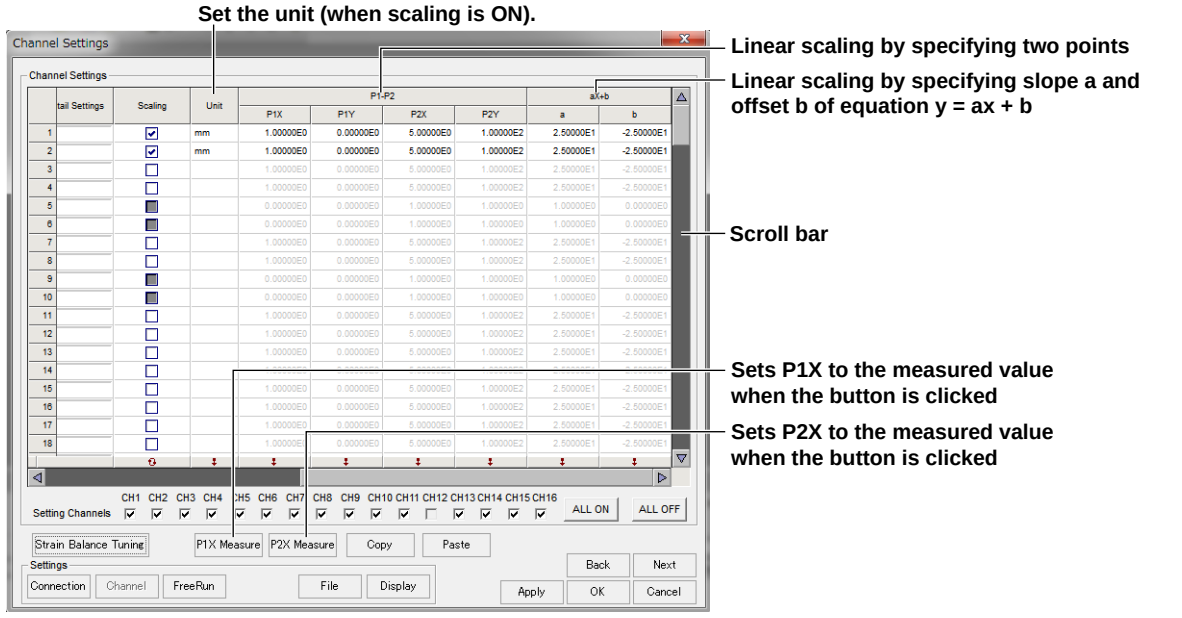
3. Search for the DL850E/DL850EV you want to connect to next, and establish a connection.

4.1 Measuring Voltage and Current

Set the measurement conditions for measuring voltage using the voltage measurement module (701250, 701251, 701255, 701267, 701261, 701262, 701265, 701275, 720210, 720211, 720220, 720221, 720254, 720250, 720266, or 720268). For details on the settings, see the DL850E/DL850EV User's Manual.

1. Click the **Channel Settings button**, or click **Channel Settings** on the Acquisition menu.





Measuring Channels

The measuring channel numbers that have been set to measure in the System Configuration window appear.

Labels (Measuring Channel Names)

You can assign names to measuring channels. Click the Label box of the measuring channel you want to name to display the text cursor or to highlight the existing name. Then, type the name. You can specify up to 16 characters for the name. By default, the channel number of the DL850E/DL850EV slot is assigned for the name.

The channel names specified here are used in setting the waveform display conditions and on the waveform window.

Setting the Coupling/Mode

Select how the input signal is coupled to the vertical control circuit from the list below.

AC: Acquires only the AC component of the input signal.

DC: Acquires all the components (DC and AC) of the input signal.

GND: Checks the ground level.

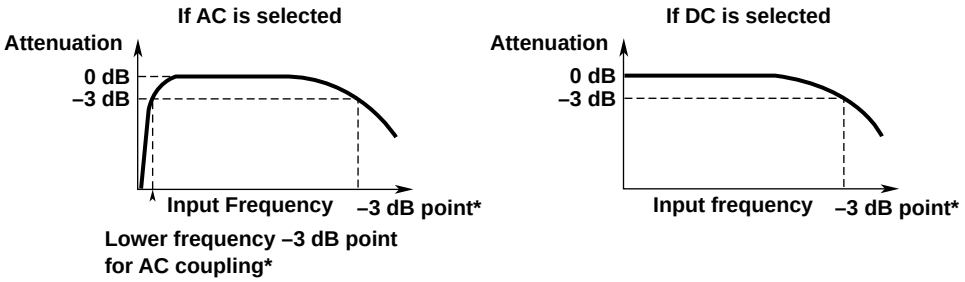
To measure rms values using the 701267 or 720268, select AC-RMS or DC-RMS. For details on rms measurement, AC-RMS, and DC-RMS, see page 1-10.

For the 701265, 720220, 720221, or 720266, select DC or GND.

Input Coupling Settings and Frequency Response

The frequency characteristics when AC or DC is specified are shown below.

Note that low-frequency signals and signal components are not acquired if AC is selected as indicated in the figure below.



* This value differs depending on the input module. For details, see the user's manual of module specifications (a separate manual).

Setting the Probe (Probe Attenuation)

Select the probe attenuation from the following according to the type of probe that you are using.

1:1, 10:1, 100:1, 1000:1, 1 A:1 V, 10 A:1 V, 100 A:1 V, 400 A:1 V

1:1 to 1000:1 represent the probe attenuations for voltage probes.

1 A:1 V to 400 A:1 V represent the output voltage rates of current probes.

The probe attenuation is fixed to 1:1 on the 701261, 701262, 701265, 720220, 720221, 720266, and 720268.

Note

If the probe type is not set correctly, the voltage and scale values of the input signals will not be displayed correctly. For example, if you use a 10:1 voltage probe but set the probe type to 1:1, the automatically measured amplitude of the waveform will be 1/10 the real value.

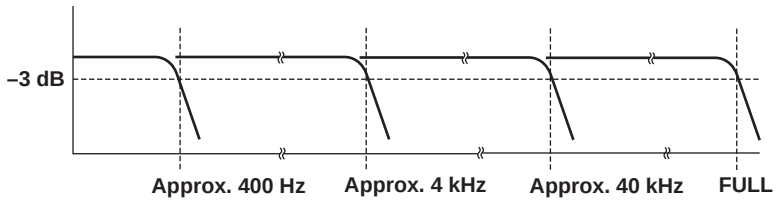
Vertical Scale (Setting the Vertical Axis Sensitivities)

Set the vertical scale according to the signal applied to the module. The vertical scale varies depending on the module and probe attenuation setting.

Setting the Bandwidth Limit

High frequency components can be eliminated from the input signal. The bandwidth varies depending on the input module. For example, frequency bandwidth limits of 400 Hz, 4 kHz, and 40 kHz are available on the 701251 (HS1M16).

The frequency characteristics when the bandwidth is limited are shown below. If Full is selected, the maximum bandwidth of the input module is used.



Bandwidth Limit on the 701262 (UNIVERSAL (AAF)), 701275 (ACCL/VOLT) and 720268 (HV (with RMS/AAF))

When measuring voltage on the 701262 (UNIVERSAL (AAF)) or 720268 (HV (with RMS/AAF)) or when bandwidth limit on the 701275 (ACCL/VOLT) is set to Auto, the anti-aliasing filter and low-pass filter settings are set to values shown below according to the sample rate.

701262/701275

Sample Rate	Anti-Aliasing Filter	Low-Pass Filter
100 kS/s	40 kHz	OFF
50 kS/s	20 kHz	OFF
20 kS/s	8 kHz	OFF
10 kS/s	4 kHz	4 kHz
5 kS/s	2 kHz	4 kHz
2 kS/s	800 Hz	4 kHz
1 kS/s	400 Hz	400 Hz
500 S/s	200 Hz	400 Hz
200 S/s	80 Hz	400 Hz
100 S/s	40 Hz	40 Hz
50 S/s	20 Hz	40 Hz
5 S/s to 20 S/s	20 Hz	40 Hz
2 S/s or less	20 Hz	40 Hz
Ext sample	40 kHz	OFF

720268

Sample Rate	Anti-Aliasing Filter	Low-Pass Filter
1 MS/s	40 kHz	40 kHz
500 kS/s	40 kHz	40 kHz
200 kS/s	40 kHz	40 kHz
100 kS/s	40 kHz	40 kHz
50 kS/s	20 kHz	40 kHz
20 kS/s	8 kHz	40 kHz
10 kS/s	4 kHz	4 kHz
5 kS/s	2 kHz	4 kHz
2 kS/s	800 Hz	4 kHz
1 kS/s	400 Hz	400 Hz
500 S/s	200 Hz	400 Hz
200 S/s	80 Hz	400 Hz
100 S/s	40 Hz	400 Hz
50 S/s or less	40 Hz	400 Hz
Ext sample	OFF	OFF

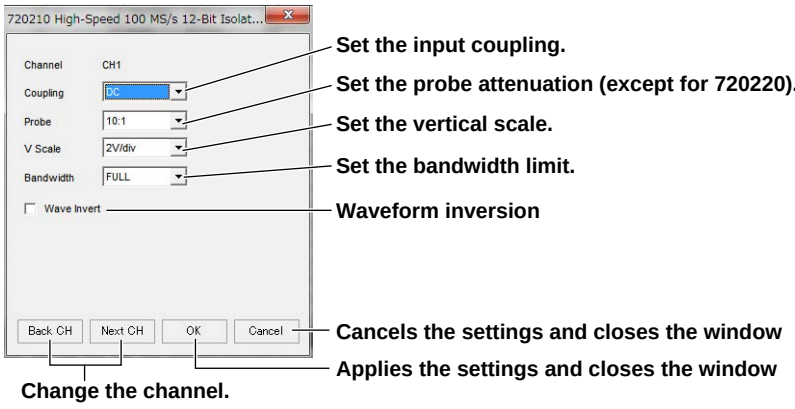
For example, for sample rates between 100 kS/s to 50 kS/s, the cutoff frequency of the anti-aliasing filter is set to 40% of the sample rate.

Detail Settings

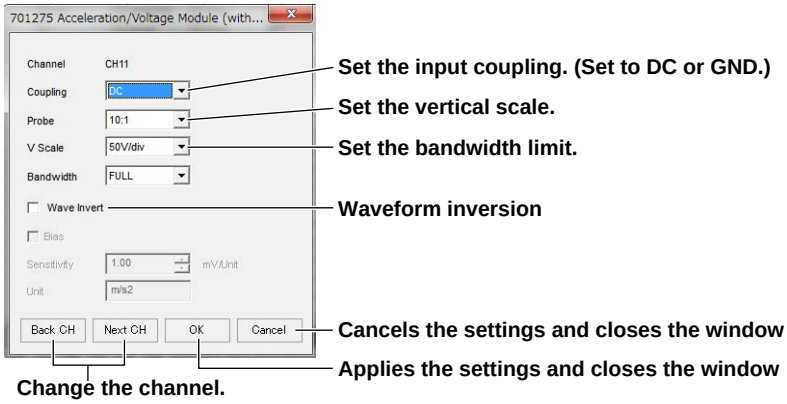
Specify detailed settings for each channel.

Click the Detail Setting box of a desired channel to open the detail setting screen.

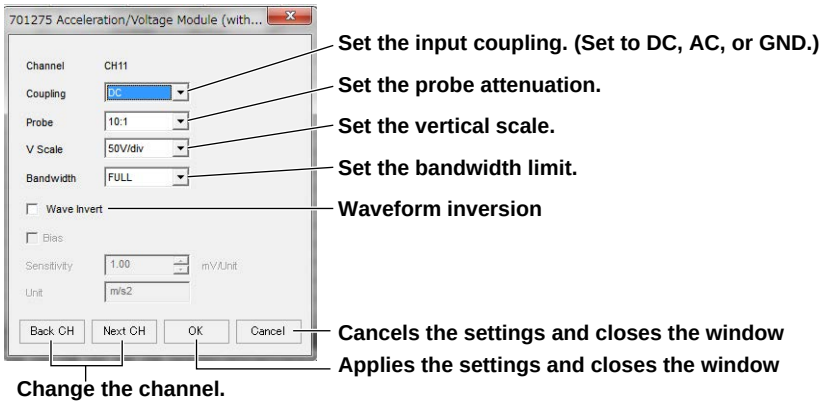
For the 701250, 701251, 701255, 701267, 720210, 720211, 720220, 720254, 720250, and 720268



For the 701261, 701262, 701265, 720221, and 720266



For the 701275



For details on the input coupling, probe attenuation, bandwidth limit, and vertical scale, see the items described earlier.

Wave Invert

Inverts the waveform around zero.

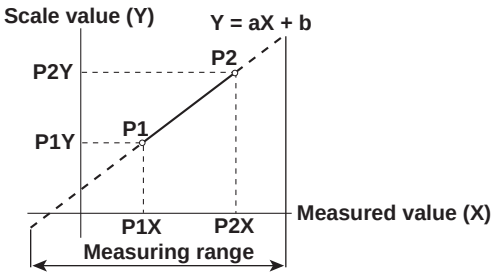
Cursor measurements is performed on the inverted waveform.

Setting the Scaling (Linear Scaling)

Select the check box to enable linear scaling.

Acquires the measured data by linear scaling the data.

There are two linear scaling methods. One method is to set the measured values of any two points and their corresponding scaled values (P1-P2) and the other method is to specify the scaling coefficient a and offset value b (aX+b).



Setting the Unit

A unit can be assigned to the linearly scaled values. Click the Unit box of the measuring channel you want to set to display the text cursor or to highlight the existing unit. Then, type the unit.

Set the unit using up to four characters.

P1-P2

Specify arbitrary scale values (P1Y and P2Y) for the measured values of two arbitrary points (P1X and P2X). The scaling equation (y = ax + b) is derived from these four values.

- Range of measured values (P1X and P2X): –9.99990E+25 to +9.99990E+30
- Range of scaled values (P1Y and P2Y): –9.99990E+25 to +9.99990E+30
  However, you cannot set measured or scaled values P1 and P2 that would make value a in the scaling equation zero or an incalculable value.

The aX+b setting changes along with the P1-P2 setting.

You can also directly assign the current measured value to P1X or P2X.

aX+b

The results obtained from the following computation based on the specified scaling coefficient a and offset b

are displayed as cursor measurement values and automated measurement values of waveform parameters.

Y = aX + b (where X is the measured value and Y is the linear scaling result)

However, coefficient a cannot be set to zero.

The P1-P2 setting changes along with the aX+b setting.

Assigning a Measured Value to P1X or P2X

You can directly assign the current measured value to P1X or P2X to set the linear scaling.

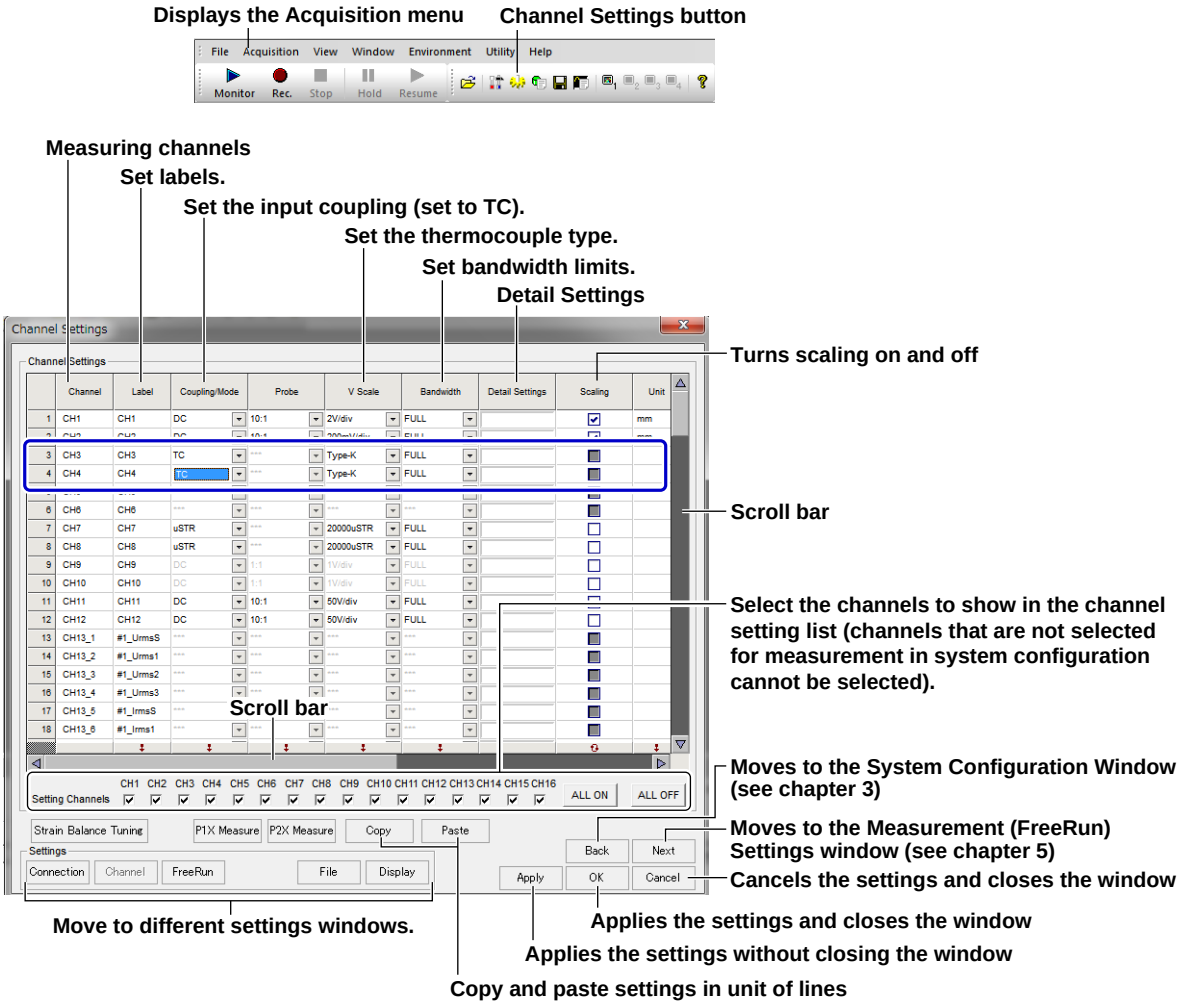
After selecting the channel you want to set, click **P1X Measure** or **P2X Measure**. The measured value when you click the button is assigned to P1X or P2X. This feature is convenient if you want to assign sensor output values to P1Y and P2Y so that measured results will be scaled to sensor output values.

You cannot execute this function while the DL850E/DL850EV is measuring or recording.

4.2 Measuring Temperature

Set the measurement conditions for measuring the temperature using the Universal Module (701261 or 701262), Temperature, High Precision Voltage Isolation Module (701265 or 720266), or 16-CH Temperature, Voltage Input Module (720221).
For details on the settings, see the DL850E/DL850EV User's Manual.

1. Click the **Channel Settings button**, or click **Channel Settings** on the Acquisition menu.



Measuring Channels

The measuring channel numbers that have been set to measure in the System Configuration window appear.

Labels (Measuring Channel Names)

You can assign names to measuring channels. Click the Label box of the measuring channel you want to name to display the text cursor or to highlight the existing name. Then, type the name. You can specify up to 16 characters for the name. By default, the channel number of the DL850E/DL850EV slot is assigned for the name.
The channel names specified here are used in setting the waveform display conditions and on the waveform window.

Setting the Coupling/Mode

Set the coupling/mode to TC.

Setting the V Scale (Thermocouple Type)

Set the vertical scale according to the thermocouple that you are using.
Select the thermocouple from below.
If the input terminal is open, the displayed value is set to a value less than or equal to the lower limit of the measuring range.

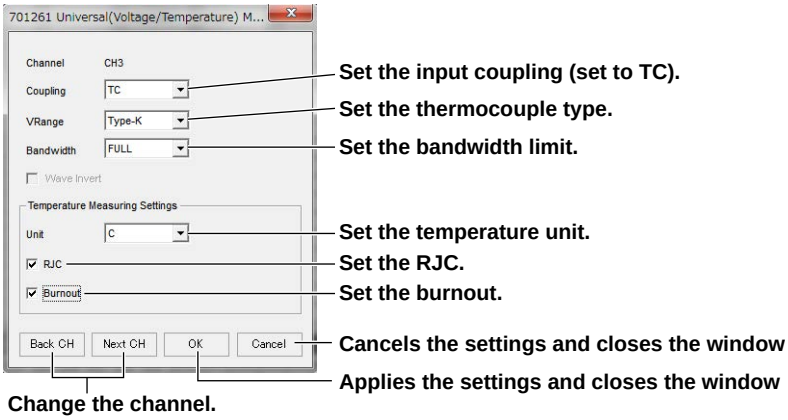
Type	Measuring Range	Type	Measuring Range
K	–200 to 1300°C	R	0 to 1700°C
E	–200 to 800°C	S	0 to 1700°C
J	–200 to 1100°C	B	400 to 1800°C
T	–200 to 400°C	N	0 to 1300°C
L	–200 to 900°C	W	0 to 2300°C
U	–200 to 400°C	Au7Fe	0 to 280 K

Setting the Bandwidth Limit

High frequency components can be eliminated from the input signal. Select 2 Hz, 8 Hz, 30 Hz, or Full.

Detail Settings

Specify detailed settings for each channel.
Click the Detail Setting box of a desired channel to open the detail setting screen.



Unit

Set the temperature unit to °C or K. The default setting is °C.

RJC

The DL850E/DL850EV normally performs reference junction compensation with the built-in RJC circuit when measuring temperature with the thermocouple. When checking the temperature measurement value, or when using an external reference junction (0°C), the internal reference junction compensation needs to be disabled.
Select the check box to use the internal reference junction compensation.
In normal cases, use the internal reference junction compensation.

Note

If a voltage corresponding to a certain temperature t is applied at the input with the RJC turned OFF and the measured temperature does not match temperature t, the DL850E/DL850EV may be damaged. Contact your nearest YOKOGAWA dealer.

Burnout

This function is used to accurately detect a burnout in the thermocouple. If you select the check box and the thermocouple measurement input detects a burn out, the measured value is fixed to the upper limit of the measurement range of each thermocouple. By default, this setting is turned OFF (do not detect burn outs).

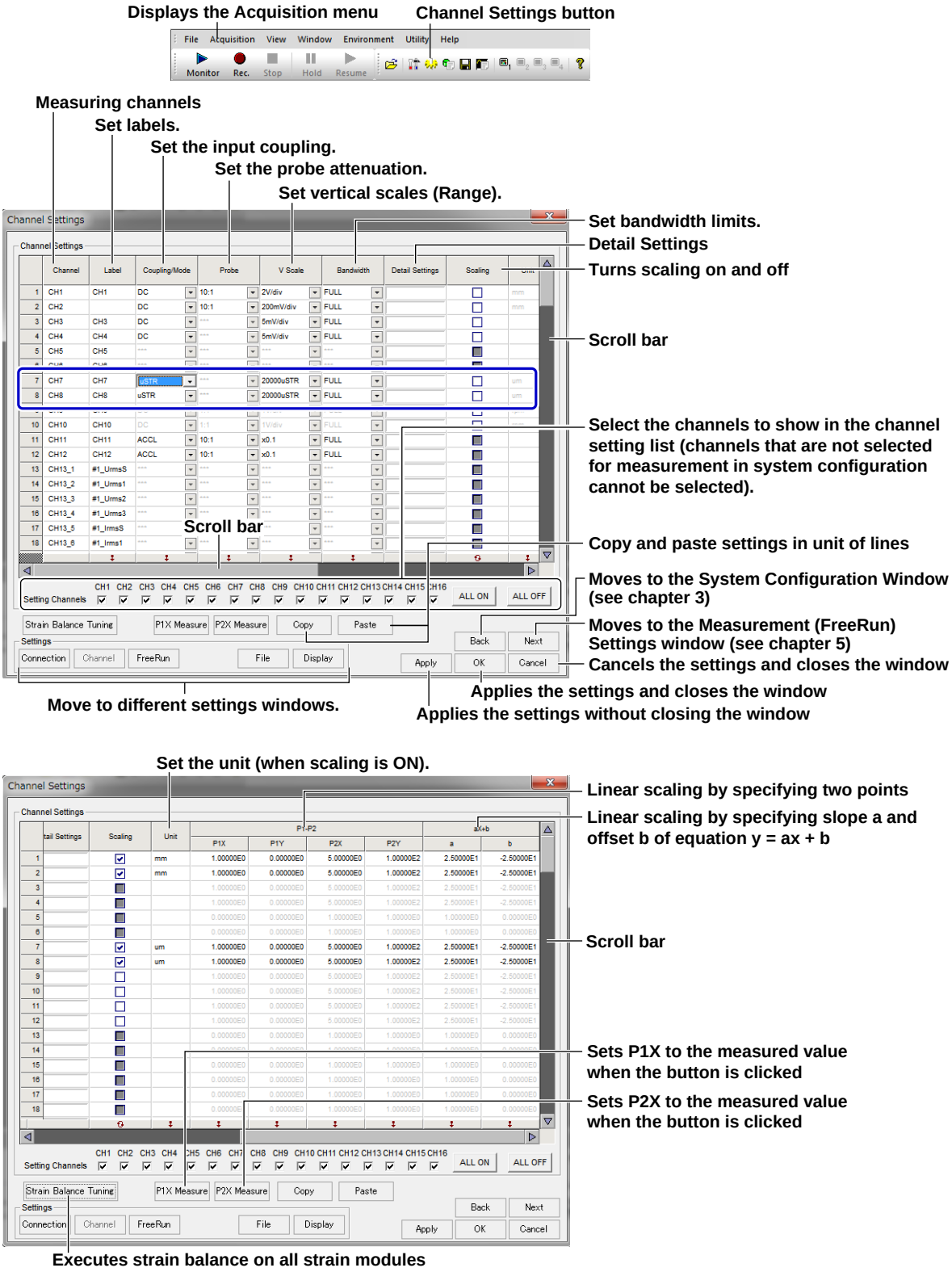
Note

Linear scaling and inverted display are not available in temperature measurements.

4.3 Measuring Strain

Set the measurement conditions for measuring the strain on the Strain Module (701270 or 701271). For details on the settings, see the DL850E/DL850EV User's Manual.

1. Click the **Channel Settings button**, or click **Channel Settings** on the Acquisition menu.



Measuring Channels

The measuring channel numbers that have been set to measure in the System Configuration window appear.

Labels (Measuring Channel Names)

You can assign names to measuring channels. Click the Label box of the measuring channel you want to name to display the text cursor or to highlight the existing name. Then, type the name. You can specify up to 16 characters for the name. By default, the channel number of the DL850E/DL850EV slot is assigned for the name.

The channel names specified here are used in setting the waveform display conditions and on the waveform window.

Setting the Coupling/Mode

Set the range unit to “the strain unit ($\times 10^{-6}$ strain): μSTR” or “the output unit of the strain gauge transducer: mV/V.” The default value is μSTR. The mV/V range is calculated from the following equation.

$(mV/V) = 0.5 \times (\mu STR)/1000$

Setting the V Scale (Range)

Select from the following:

- If μSTR Is Selected
  500 μSTR, 1000 μSTR, 2000 μSTR, 5000 μSTR, 10000 μSTR, and 20000 μSTR
  For details on the measuring range, see the DL850E/DL850EV User’s Manual.
- If mV/V Is Selected
  0.25 mV/V, 0.5 mV/V, 1 mV/V, 2.5 mV/V, 5 mV/V, and 10 mV/V
  For details on the measuring range, see the DL850E/DL850EV User’s Manual.

Note

Be sure to execute balancing if you change the vertical scale.

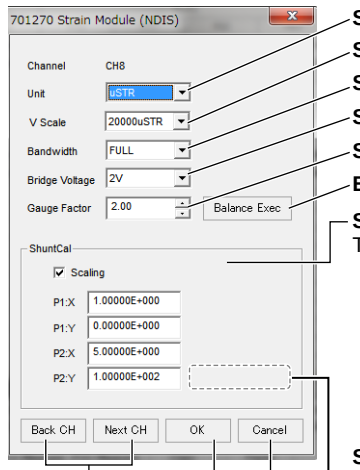
Setting the Bandwidth Limit

High frequency components can be eliminated from the input signal. Select 10 Hz, 100 Hz, 1 kHz, or Full. For details, see section 4.1, “Measuring Voltage and Current.”

Detail Settings

Specify detailed settings for each channel.

Click the Detail Setting box of a desired channel to open the detail setting screen.



Set the range unit.

Set the vertical scale.

Set the bandwidth limit.

Set the bridge voltage.

Set the gauge factor.

Executes the strain balance

Set the shunt calibration (701271).

To perform shunt calibration, select the Scaling check box.

- **P1:X:** Input value when the relay circuit is off (no need to set this in normal circumstances)
- **P1:Y:** Value corresponding to P1:X when the relay circuit is off (normally 0)
- **P2:X:** Input value when the relay circuit is on (shunt resistance, no need to set this in normal circumstances)
- **P2:Y:** Strain value corresponding to the shunt resistance when the relay circuit is on

Shunt Calibration (Only on the 701271 (STRAIN_DSUB))

ShuntCal Exec **Executes shunt calibration**

Change the channel.

Cancels the settings and closes the window

Applies the settings and closes the window

Selecting the Bridge Voltage

You can select the voltage to be applied to the bridge head.

2V: When the bridge head resistance (bridge resistance) is 120 Ω to 1000 Ω

5V:* When the bridge resistance is 350 Ω to 1000 Ω

10V:* When the bridge resistance is 350 Ω to 1000 Ω

* The bridge voltage can be set to 5 V or 10 V only if the following conditions are met.

- The bridge resistance is 350 Ω or greater.
- A strain gauge transducer that supports the bridge voltage of 5 V or 10 V.

The bridge voltage cannot be changed while data acquisition is in progress.

Setting the Gauge Factor

You can set the gauge factor of the strain gauge.

Selectable range: 1.90 to 2.20 (the resolution is 0.01)

The gauge factor is a unique constant defined for the strain gauge. It is usually described in the manual for the strain gauge. The gauge factor cannot be changed while data acquisition is in progress.

Gauge Factor If mV/V Is Selected

This software allows you to set the gauge factor to any value. However, if there are no specifications given on the strain gauge transducer, set the gauge factor to 2.00. If the gauge factor is not 2.00, e is derived in the DL850E/DL850EV using the following equation.

$e = (4/K) \times (V/E)$ e: Measured value of the strain gauge transducer [mV/V]

V: Voltage measured on the bridge [V]

E: Voltage applied to the bridge [V]

K: Gauge factor

Executing Strain Balancing

Balancing automatically compensates the unbalanced portion of the bridge resistance. Balancing takes a few seconds.

Executable range of balancing: ±10000 µSTR (if set to µSTR)

±5 mV/V (if set to mV/V)

Note

Perform balancing by connecting a bridge box or strain gauge transducer and without applying a load to the strain gauge.

Shunt Calibration (Only on the 701271 (STRAIN_DSUB))

The 701271 Strain Module (STRAIN_DSUB) supports shunt calibration.
For details, see the DL850E/DL850EV User's Manual.

Setting the Scaling (Linear Scaling)

Select the check box to enable linear scaling.
Acquires the measured data by linear scaling the data.
For details on linear scaling, see page 4-7.

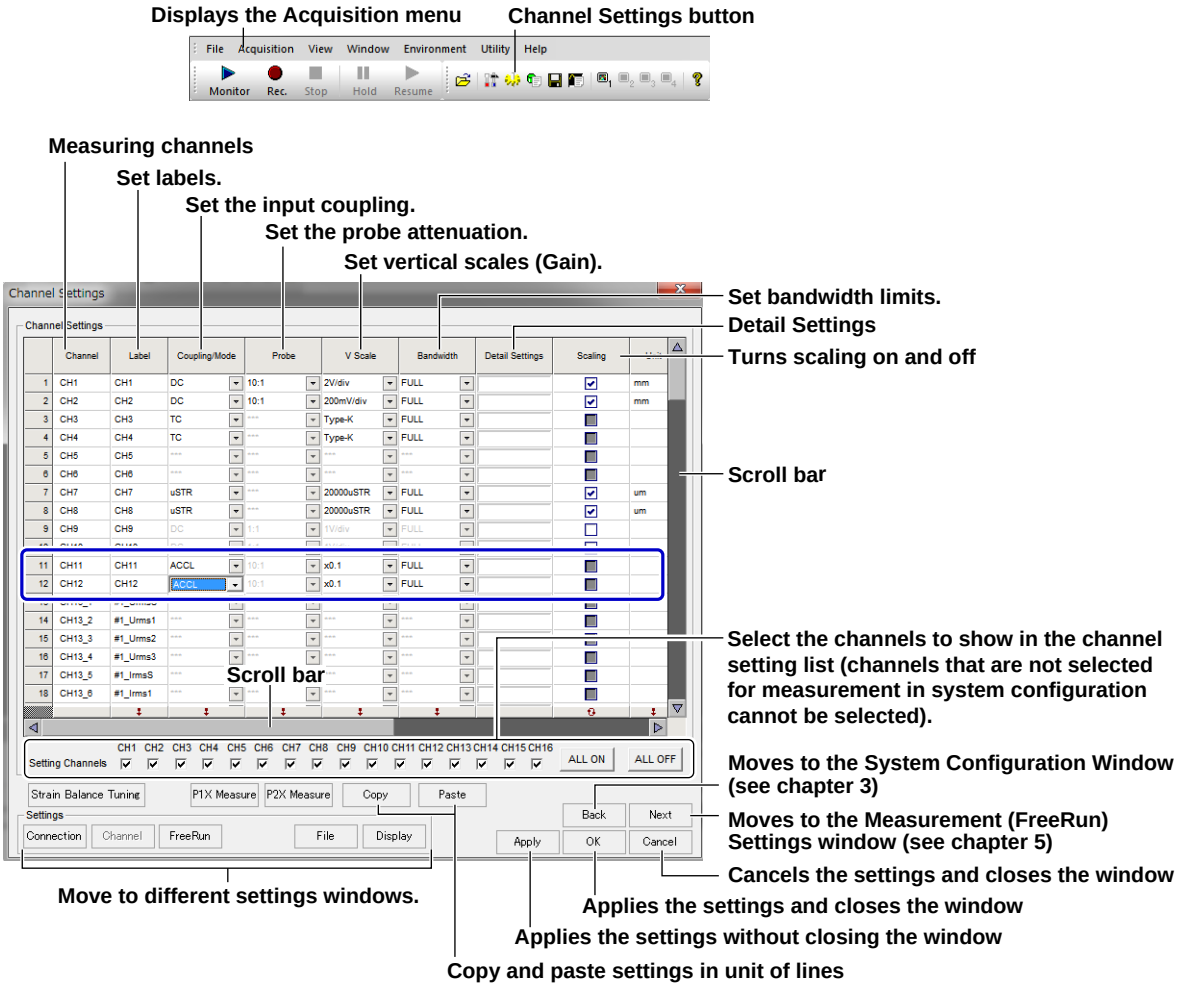
Notes When Making Strain Measurements

- Be sure to execute balancing when making strain measurements.
- Select a bridge voltage of 5 V or 10 V when the bridge resistance is greater than or equal to 350 Ω. If a bridge voltage of 5 V or 10 V is applied when the bridge resistance is less than 350 Ω, correct measurements will not be made.
- If using a strain gauge transducer, use a bridge voltage in the recommended voltage range of the transducer.
- Correction cannot be executed if a strain gauge bridge (bridge head) or a strain gauge transducer is not connected to the channel on which balancing is to be executed.
- If balancing fails on any of the specified channels, an error message will be displayed.
- If the DL850E/DL850EV is turned ON, a new strain gauge is connected, or the vertical scale, bridge voltage, or gauge factor is changed, balancing must be performed again before making further measurements.
- If you switch the unit, the unit of all related parameters of the channel is switched accordingly (e.g., cursor measurement values).

4.4 Measuring Acceleration

Set the measurement conditions for measuring the acceleration on the Acceleration Module (701275). For details on the settings, see the DL850E/DL850EV User's Manual.

1. Click the **Channel Settings button**, or click **Channel Settings** on the Acquisition menu.



Measuring Channels

The measuring channel numbers that have been set to measure in the System Configuration window appear.

Labels (Measuring Channel Names)

You can assign names to measuring channels. Click the Label box of the measuring channel you want to name to display the text cursor or to highlight the existing name. Then, type the name. You can specify up to 16 characters for the name. By default, the channel number of the DL850E/DL850EV slot is assigned for the name.

The channel names specified here are used in setting the waveform display conditions and on the waveform window.

Setting the Coupling/Mode

Set the coupling/mode to ACCL.

Setting the V Scale (Gain)

Set the gain in the range from ×0.1 to ×100.

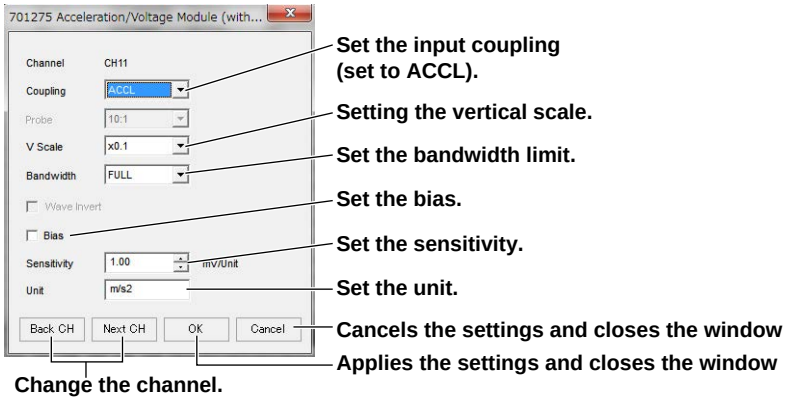
Setting the Bandwidth Limit

High frequency components can be eliminated from the input signal. Select 40 Hz, 400 Hz, 4 kHz, Auto, or Full. For details, see section 4.2, “Measuring Voltage and Current.”

Detail Settings

Specify detailed settings for each channel.

Click the Detail Setting box of a desired channel to open the detail setting screen.



Setting the Bias

If the bias is turned on, a 4-mA bias current is supplied to the acceleration sensor. Do not connect the acceleration sensor with the bias turned on.

Setting the Sensitivity

Set the sensitivity of the acceleration sensor in the range of 0.10 mV/Unit to 2000.00 mV/Unit.

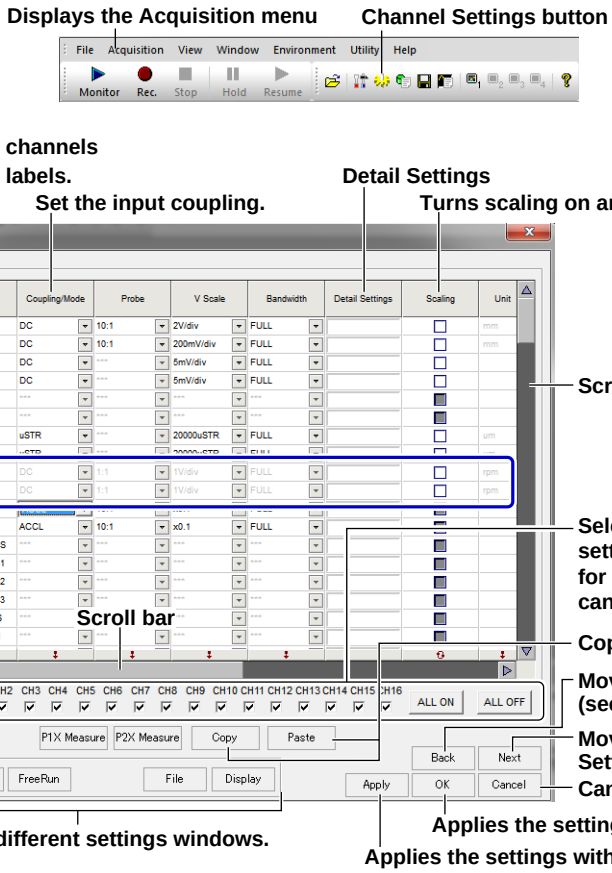
Setting the Unit

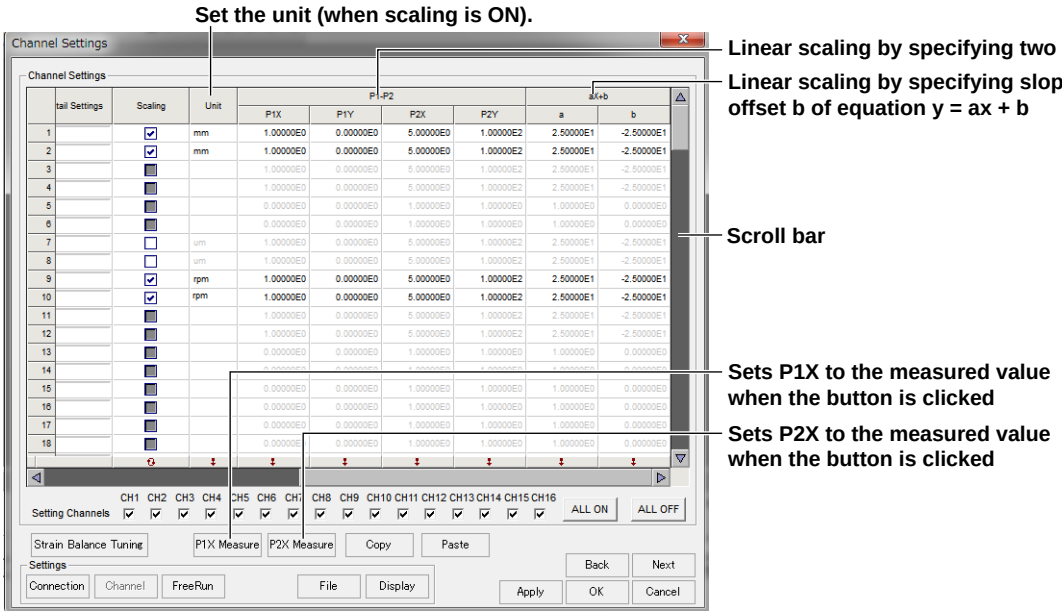
Set the unit using up to four characters. The default setting is m/s^2.

4.5 Measuring Frequency, Number of Rotations, Period, Duty Cycle, Power Supply Frequency, Pulse Width, Pulse Integration, and Velocity

Set the measurement conditions for measuring the frequency on the Frequency Module (701281 or 720281). For details on the settings, see the DL850E/DL850EV User's Manual.

1. Click the **Channel Settings button**, or click **Channel Settings** on the Acquisition menu.





Settings Common to Frequency, Number of Rotations, Period, Duty Cycle, Power Supply Frequency, Pulse Width, Pulse Integration, and Velocity Measurements

Measuring Channels

The measuring channel numbers that have been set to measure in the System Configuration window appear.

Labels (Measuring Channel Names)

You can assign names to measuring channels. Click the Label box of the measuring channel you want to name to display the text cursor or to highlight the existing name. Then, type the name. You can specify up to 16 characters for the name. By default, the channel number of the DL850E/DL850EV slot is assigned for the name.

The channel names specified here are used in setting the waveform display conditions and on the waveform window.

Setting the Scaling (Linear Scaling)

Select the check box to enable linear scaling.

Acquires the measured data by linear scaling the data.

For details on linear scaling, see page 4-5.

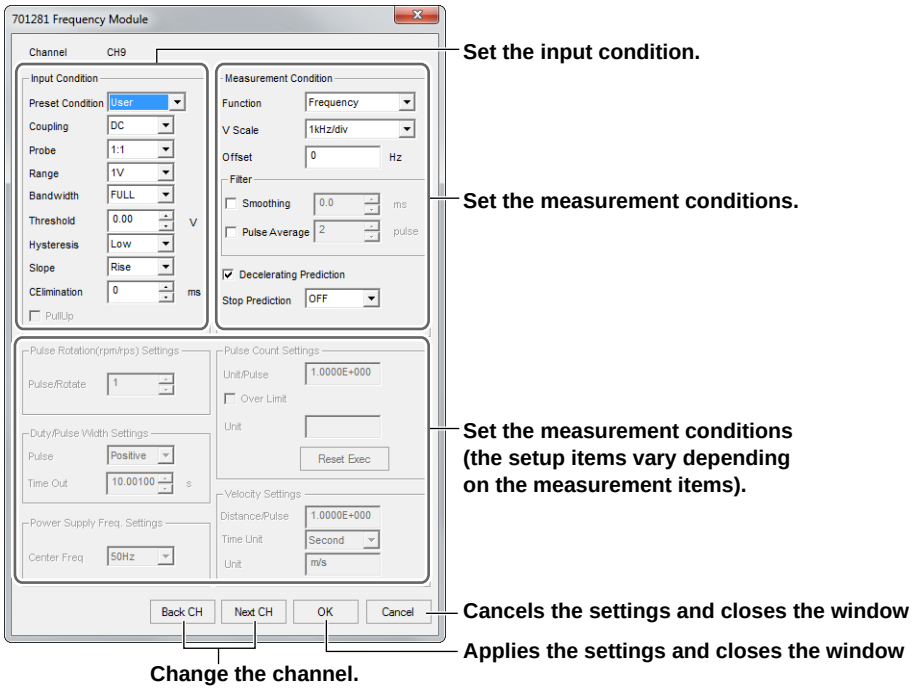
Note

The coupling, probe, range, and bandwidth limit of the frequency module can be set on the detail setting screen.

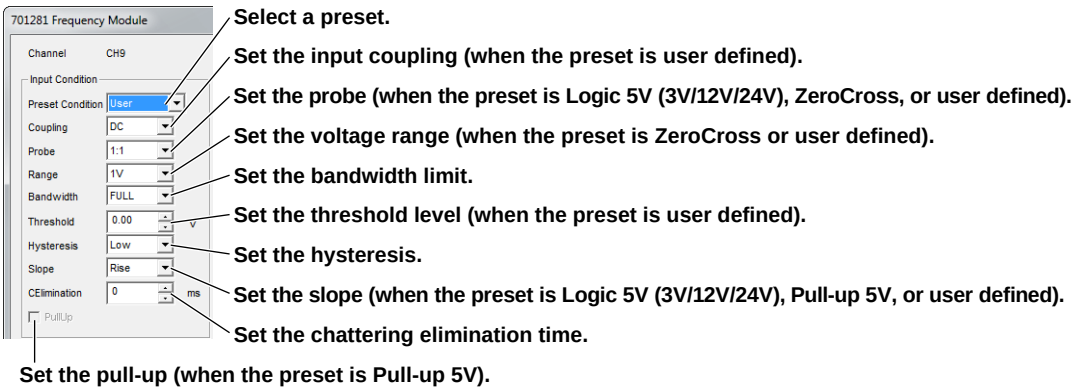
Detail Settings

Specify detailed settings for each channel.

Click the Detail Setting box of a desired channel to open the detail setting screen.



Setting the Input Condition



Preset

Select from the following presets according to the sensor that you are using.

- Logic 5V: 5-V logic signal, 5-V output sensor, and sensor with TTL output
- Logic 3V: 3-V logic signal and 3-V output sensor
- Logic 12V: 12-V driven relay/sequence circuit and 12-V driven sensor
- Logic 24V: 24-V driven relay/sequence circuit and 24-V driven sensor
- Pull-up 5V: Open-collector output sensor and contact circuit
- ZeroCross: Sensor/Encoder that outputs positive and negative voltages and sensor that outputs sine waves
- AC100V: When measuring a supply voltage of 100 VAC using the isolated probe (700929)
- AC200V: When measuring a supply voltage of 200 VAC using the isolated probe (700929)
- EM Pickup: Power-generating electromagnetic pickup
- User: Any sensor

For details on the settings of each preset, see the DL850E/DL850EV User's Manual.

Setting the Input Coupling

Set the coupling to DC or AC. You can change the setting only if the preset is set to User.

Setting the Probe (Probe Attenuation)

Set the probe attenuation to 1:1 or 10:1. You can change the setting only if the preset is set to Logic 5V (3V/12V/24V), ZeroCross, or User.

Setting the Range

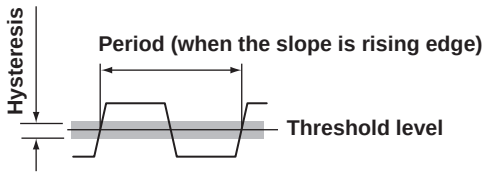
Set the voltage range to ±1 V, ±2 V, ±5 V, ±10 V, ±20 V, or ±50 V. You can change the setting only if the preset is set to ZeroCross or User.

Setting the Bandwidth Limit

Set the bandwidth limit to 100 Hz, 1 kHz, 10 kHz, 100 kHz, or Full. You can change the setting on all presets. However, if the preset is set to AC100V or AC200V, the bandwidth limit cannot be set to Full.

Setting the Threshold Level

Set the threshold level used to determine the period within the voltage range. You can change the setting only if the preset is set to User.



Setting the Hysteresis

Set Hys (hysteresis) to Low, Middle, or High. You can change the setting on all presets.

If Changing the Slope Setting

Set the slope to ↑ (rising) or ↓ (falling).
You can change the setting only if the preset is set to Logic 5V (3V/12V/24V), Pull-up 5V, or User.

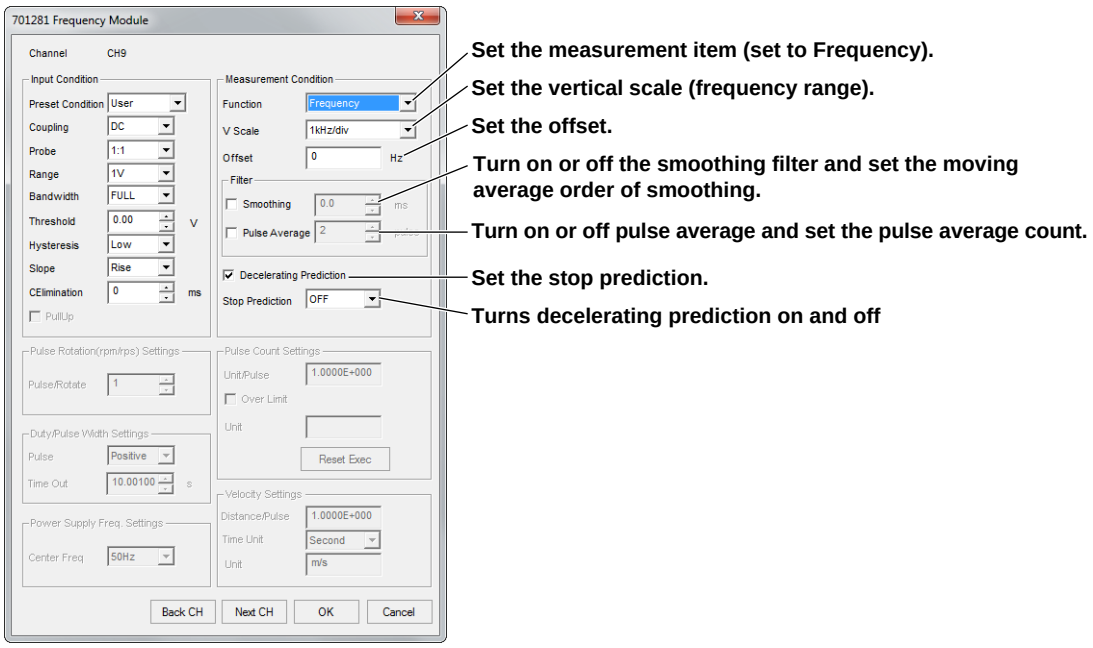
Setting the Chatter Elimination Function

You can change the setting on all presets. This function eliminates the chatter that occurs such when the contact input is turned on or off. This allows changes in the signal over the specified time to be ignored. Set the interval in the range of 0 to 1000 ms (1-ms resolution). This function applies to both the rising and falling slopes.

Setting the Pull-Up

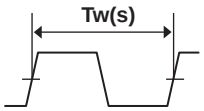
If the preset is set to Pull-up 5V, set whether to use pull-up.
If using pull-up, set the input voltage in the range of 0 V to 5 V. If a voltage exceeding this range is applied, the internal protection circuit will cut off the pull-up circuit.

Measuring Frequency



Setting the Measurement Item

Set the function to Frequency. The measurable range of frequencies is 0.01 Hz to 500 kHz.
Frequency (Hz) = 1/Tw (s)

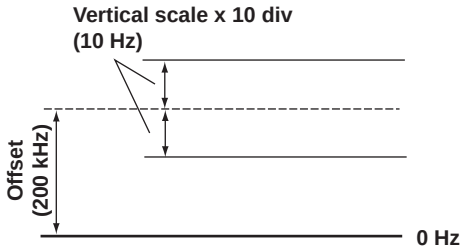


Setting the Vertical Scale (Frequency Range)

Set the vertical scale of frequency according to the frequency of the signal to be measured.
The selectable range is 0.1 Hz/div to 100 kHz/div in 1-2-5 steps.

Setting the Offset

Set the offset value in the range 0 to 1000 times the vertical scale or 0 to 500 kHz.
The frequency in the vertical scale indicated above can be measured around the specified offset value.
Below is an example for a vertical scale of 1 Hz and offset of 200 kHz.



Setting the Smoothing Filter

The DL850E/DL850EV performs moving average of the order that is determined from a specified time.
Moving average order = the specified time/40 µs (the specified time: 0.0 to 1000.0 ms)

Setting the Pulse Average

Measures the input pulse by dividing the pulse by the specified number of pulses (1 to 4096 pulses).
Specify 1 to not perform pulse averaging.

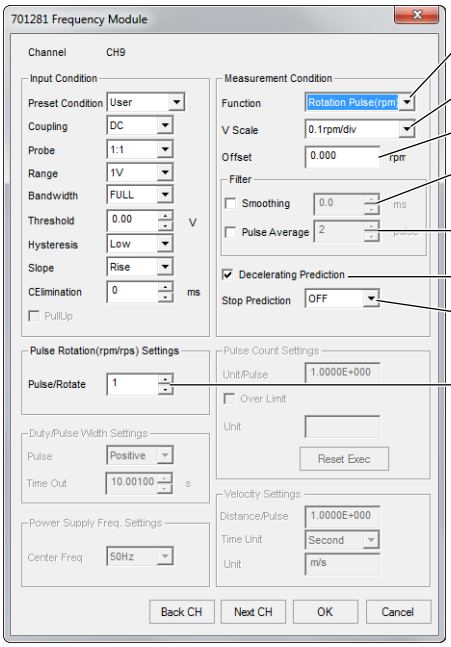
Turning Decelerating Prediction On and Off

Select ON to automatically compute and predict the deceleration curve from the elapsed time after the pulse stops. Select OFF to not perform decelerating prediction.

Setting the Stop Prediction

Set the time from the point when the pulse input stops to the point when the function determines that the object has stopped. The time can be set to ×1.5, ×2, ×3, ... , ×9, and ×10 (10 settings) of the pulse period (T) of the pulse one period before the pulse input stopped.
Select OFF to not perform stop prediction.

Measuring the Number of Rotations



Set the measurement item (set to Rotation Pulse (rpm) or Rotation Pulse (rps)).

Set the vertical scale (rotation pulse range).

Set the offset.

Turn on or off the smoothing filter and set the moving average order of smoothing.

Turn on or off pulse average and set the pulse average count.

Set the stop prediction.

Turns decelerating prediction on and off

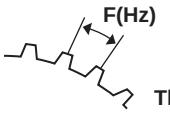
Set the number of pulses per rotation.

Setting the Measurement Item

Set the function to Rotation Pulse (rpm) or Rotation Pulse (rps). The measurable range of rotations is 0.01 rpm to 100000 rpm or 0.001 rps to 2000 rps.

RPMs = Frequency (Hz)/the number of pulses per rotation (Nr) × 60

RPSs = Frequency (Hz)/the number of pulses per rotation (Nr)



The number of pulses per rotation: Nr (1 to 99999)

Setting the Vertical Scale (Rotation Pulse Range)

Set the vertical scale of rotations according to the rotations of the signal to be measured.

The selectable range is 0.1 rpm/div to 10 krpm/div in 1-2-5 steps or 0.01 rps/div to 200 rps/div in 1-2-5 steps.

Setting the Offset

Set the offset value.

The rotations in the vertical scale indicated above can be measured around the specified offset value.

For Rotation Pulse (rpm): 0 to 100 times the rotation pulse range value or 0 to 50 krpm

For Rotation Pulse (rps): 0 to 100 times the rotation pulse range value or 0 to 1000 rps

Setting the Smoothing Filter

The DL850E/DL850EV performs moving average of the order that is determined from a specified time.

Moving average order = the specified time/40 µs (the specified time: 0.0 to 1000.0 ms)

Setting the Pulse Average

Measures the input pulse by dividing the pulse by the specified number of pulses (1 to 4096 pulses). Specify 1 to not perform pulse averaging.

Turning Decelerating Prediction On and Off

Select ON to automatically compute and predict the deceleration curve from the elapsed time after the pulse stops. Select OFF to not perform decelerating prediction.

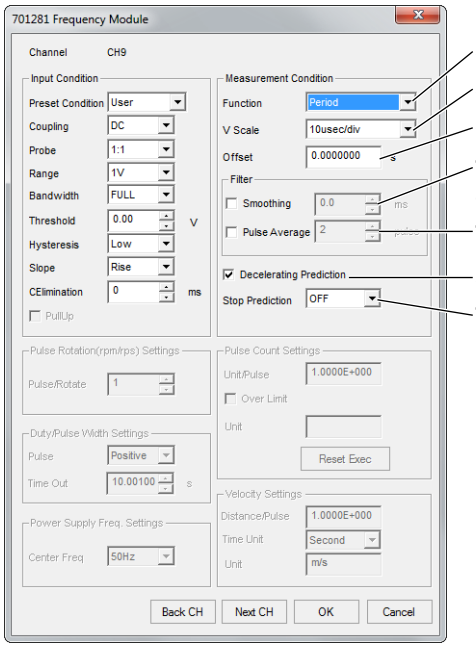
Setting the Stop Prediction

Set the time from the point when the pulse input stops to the point when the function determines that the object has stopped. The time can be set to ×1.5, ×2, ×3, ... , ×9, and ×10 (10 settings) of the pulse period (T) of the pulse one period before the pulse input stopped.
Select OFF to not perform stop prediction.

Setting the Number of Pulses per Rotation

Set the number of pulses per rotation of the measured signal in the range of 1 to 99999 to determine the number of rotations.

Measuring Period



Set the measurement item (set to Period).

Set the vertical scale (period range).

Set the offset.

Turn on or off the smoothing filter and set the moving average order of smoothing.

Turn on or off pulse average and set the pulse average count.

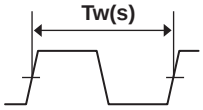
Set the stop prediction.

Turns decelerating prediction on and off

Setting the Measurement Item

Set the function to Period. The measurable range of period is 2 µs to 50 s.

Period (s) = Tw (s)



Setting the Vertical Scale (Period Range)

Set the vertical scale of period according to the period of the signal to be measured.
The selectable range is 10 µs to 5 s in 1-2-5 steps.

Setting the Offset

Set the offset value in the range 0 to 1000 times the vertical scale or 0 to 50 s.
The period in the vertical scale indicated above can be measured around the specified offset value.

Setting the Smoothing Filter

The DL850E/DL850EV performs moving average of the order that is determined from a specified time.
Moving average order = the specified time/40 µs (the specified time: 0.0 to 1000.0 ms)

Setting the Pulse Average

Measures the input pulse by dividing the pulse by the specified number of pulses (1 to 4096 pulses).
Specify 1 to not perform pulse averaging.

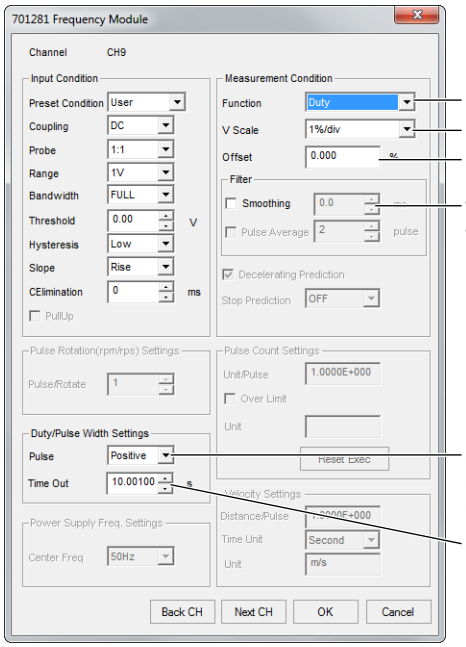
Turning Decelerating Prediction On and Off

Select ON to automatically compute and predict the deceleration curve from the elapsed time after the pulse stops. Select OFF to not perform decelerating prediction.

Setting the Stop Prediction

Set the time from the point when the pulse input stops to the point when the function determines that the object has stopped. The time can be set to ×1.5, ×2, ×3, ... , ×9, and ×10 (10 settings) of the pulse period (T) of the pulse one period before the pulse input stopped.
Select OFF to not perform stop prediction.

Measuring Duty Cycle



Set the measurement item (set to Duty).

Set the vertical scale (duty cycle range).

Set the offset.

Turn on or off the smoothing filter and set the moving average order of smoothing.

Set the measurement pulse.
Set whether to measure the duty cycle of the positive or negative pulse.

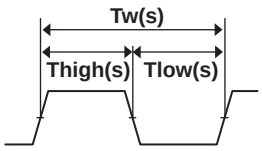
Set the timeout period.

Setting the Measurement Item

Set the function to Duty. The measurable range of duty cycle is 0 to 100%.

Duty cycle = Thigh (s)/Tw (s) (if the measured pulse is positive)

Duty cycle = Tlow (s)/Tw (s) (if the measured pulse is negative)



Setting the Vertical Scale (Duty Cycle Range)

Set the vertical scale of duty cycle according to the duty cycle of the signal to be measured.

Select 1%/div, 2%/div, 5%/div, 10%/div, or 20%/div.

Setting the Offset

Set the offset value.

The duty cycle in the vertical scale indicated above can be measured around the specified offset value.

Selectable range: 0 to 100%

Setting the Smoothing Filter

The DL850E/DL850EV performs moving average of the order that is determined from a specified time.

Moving average order = the specified time/40 µs (the specified time: 0.0 to 1000.0 ms)

Setting the Measurement Pulse

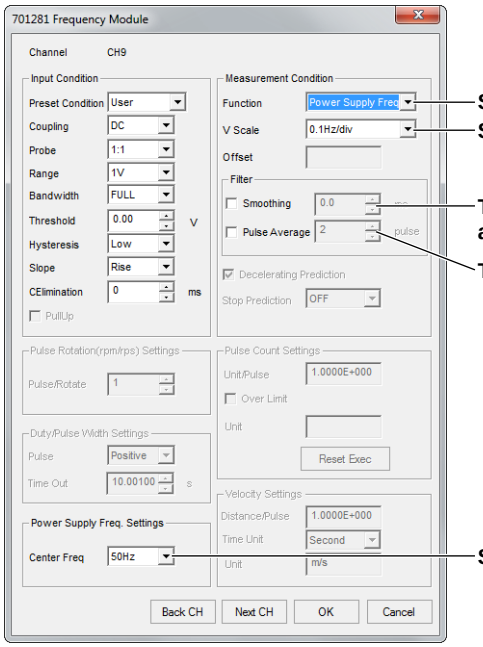
Set whether to measure the duty cycle of the pulse width above the threshold level (positive) or the duty cycle of the pulse width below the threshold level (negative).

Setting the Timeout Period

Set the timeout period. You can set this value when the frequency module is the 701281 (module version 0x04 or later) or the 720281.

Selectable range: 0.00001s (10 µs) to 80 s

Measuring Power Supply Frequency



Set the measurement item (set to Power Supply Freq.).

Set the vertical scale (frequency range).

Turn on or off the smoothing filter and set the moving average order of smoothing.

Turn on or off pulse average and set the pulse average count.

Set the center frequency.

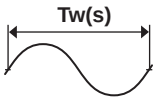
Setting the Measurement Item

Set the function to Power Supply Frequency.

The measurable range of power supply frequency is (50 Hz, 60 Hz, 400 Hz) ±20 Hz.

Power supply frequency (Hz) = 1/Tw (s)

Resolution: 0.01 Hz



Setting the Vertical Scale (Frequency Range)

Set the vertical scale of frequency according to the power supply frequency of the signal to be measured.

Select 0.1 Hz/div, 0.2 Hz/div, 0.5 Hz/div, 1 Hz/div, or 2 Hz/div.

Measurement is possible in the center frequency ± vertical scale x 10.

Setting the Smoothing Filter

The DL850E/DL850EV performs moving average of the order that is determined from a specified time.

Moving average order = the specified time/40 µs (the specified time: 0.0 to 1000.0 ms)

Setting the Pulse Average

Measures the input pulse by dividing the pulse by the specified number of pulses (1 to 4096 pulses).

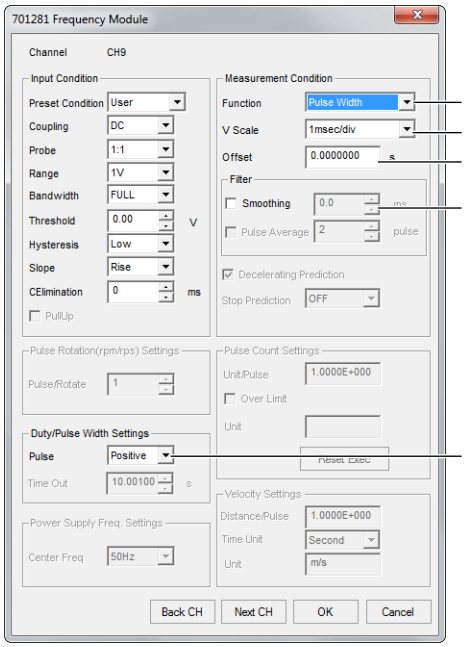
Specify 1 to not perform pulse averaging.

Set the center frequency.

Set the center frequency of the measuring range.

Select 50 Hz, 60 Hz, or 400 Hz.

Measuring the Pulse Width



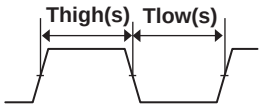
Set the measurement item (set to Pulse Width).
Set the vertical scale (pulse width range).
Set the offset.
Turn on or off the smoothing filter and set the moving average order of smoothing.
Set the measurement pulse.
Set whether to measure the pulse width of the positive or negative pulse.

Setting the Measurement Item

Set the function to Pulse Width. The measurable range of pulse width is 1 µs to 50 s.

Pulse width = Thigh(s) (when the measurement pulse is set to Positive)

Pulse width = Tlow(s) (when the measurement pulse is set to Negative)



Set the Vertical Scale (pulse width range).

Set the vertical scale of pulse width according to the pulse width of the signal to be measured.

The selectable range is 10 µs/div to 5 s/div in 1-2-5 steps.

Setting the Offset

Set the offset value.

The pulse width in the vertical scale indicated above can be measured around the specified offset value.

The selectable range is 0 to 100 times the pulse width range value or 0 to 50 s.

Setting the Smoothing Filter

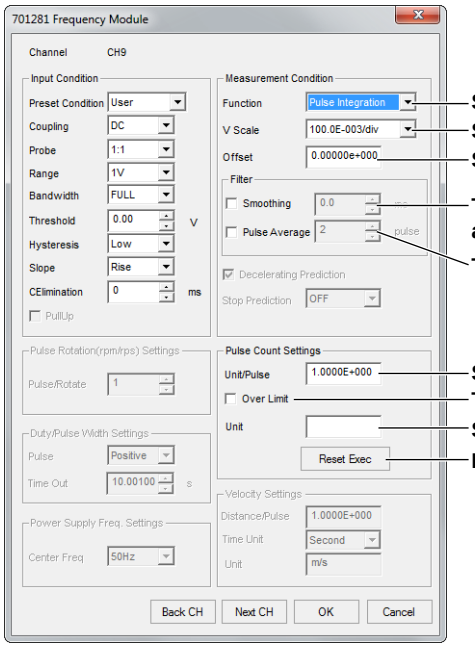
The DL850E/DL850EV performs moving average of the order that is determined from a specified time.

Moving average order = the specified time/40 µs (the specified time: 0.0 to 1000.0 ms)

Setting the Measurement Pulse

Set whether to measure the pulse width above the threshold level (positive) or the pulse width below the threshold level (negative).

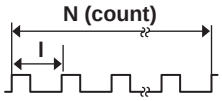
Measuring Pulse Integration



Set the measurement item (set to Pulse Integration).
Set the vertical scale (pulse integration range).
Set the offset.
Turn on or off the smoothing filter and set the moving average order of smoothing.
Turn on or off pulse average and set the pulse average count.
Set the unit/pulse (physical amount per pulse).
Turns over-limit reset on and off
Set the unit.
Resets the integrated value

Setting the Measurement Item

Set the function to Pulse Integration. The measurable range of pulse integration is 0 to 2×10^9 counts.
Pulse integration quantity = N (count) × physical quantity per pulse (I)
Set the physical quantity per pulse (I) to distance or flow rate.



Set the Vertical Scale (pulse integration range).

Set the vertical scale of pulse integration according to the pulse integration of the signal to be measured.
The selectable range is 10.0E-21/div to 500.0E+18/div in 1-2-5 steps.

Setting the Offset

Set the offset value.
The pulse integration in the vertical scale indicated above can be performed around the specified offset value.
Range: 100 times the pulse integration range value or 1.0000E+22

Setting the Smoothing Filter

The DL850E/DL850EV performs moving average of the order that is determined from a specified time.
Moving average order = the specified time/40 µs (the specified time: 0.0 to 1000.0 ms)

Setting the Pulse Average

Measures the input pulse by dividing the pulse by the specified number of pulses (1 to 4096 pulses).
Specify 1 to not perform pulse averaging.

Setting the Unit/Pulse

Set the physical quantity per pulse in the range of –9.9999E+30 to 9.9999E+30.

Setting the Over Limit

Set Over Limit to ON to automatically reset the pulse count when the range is exceeded.

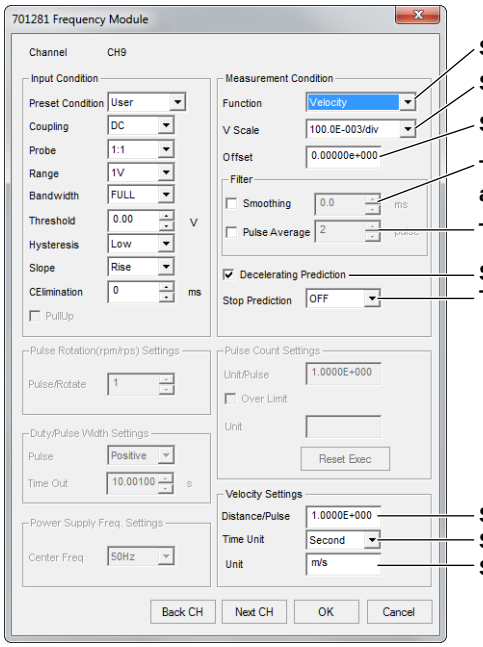
Setting the Unit

If necessary, set the pulse integration unit using up to four characters.

Executing Reset

Resets the integrated value. Use this to reset the value integrated up to now.

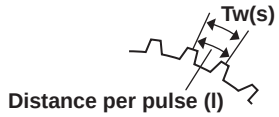
Measuring the Velocity



Set the measurement item (set to Velocity).
Set the vertical scale (velocity range).
Set the offset.
Turn on or off the smoothing filter and set the moving average order of smoothing.
Turn on or off pulse average and set the pulse average count.
Set the stop prediction.
Turns decelerating prediction on and off
Set the velocity/pulse (velocity per pulse).
Set the time unit to Hour, Minute, or Second.
Set the unit.

Setting the Measurement Item

Set the function to Velocity. This function measures the velocity corresponding to a pulse signal.
The measurable pulse signal frequency range is 0.01 Hz to 200 kHz.
Velocity (km/h) = (distance per pulsel(km) / Tw(s))×3600
Velocity (m/s) = distance per pulsel(m) / Tw(s)



Setting the Vertical Scale (Velocity Range)

Set the vertical scale of velocity according to the velocity of the signal to be measured.
The selectable range is 10.0E-21/div to 500.0E+18/div in 1-2-5 steps.

Setting the Offset

Set the offset value in the range 0 to 1000 times the vertical scale or 0 to 1.0000E+22.
The velocity in the vertical scale indicated above can be measured around the specified offset value.

Setting the Smoothing Filter

The DL850E/DL850EV performs moving average of the order that is determined from a specified time.
Moving average order = the specified time/40 µs (the specified time: 0.0 to 1000.0 ms)

Setting the Pulse Average

Measures the input pulse by dividing the pulse by the specified number of pulses (1 to 4096 pulses).
Specify 1 to not perform pulse averaging.

Turning Decelerating Prediction On and Off

Select ON to automatically compute and predict the deceleration curve from the elapsed time after the pulse stops. Select OFF to not perform decelerating prediction.

Setting the Stop Prediction

Set the time from the point when the pulse input stops to the point when the function determines that the object has stopped. The time can be set to ×1.5, ×2, ×3, ... , ×9, and ×10 (10 settings) of the pulse period (T) of the pulse one period before the pulse input stopped.
Select OFF to not perform stop prediction.

Setting the Distance/Pulse

Set the velocity per pulse in the range of –9.9999E+30 to 9.9999E+30.

Setting the Time Unit

Set the time unit to Hour, Minute, or Second.
The output is automatically converted to velocity based on the specified time unit.

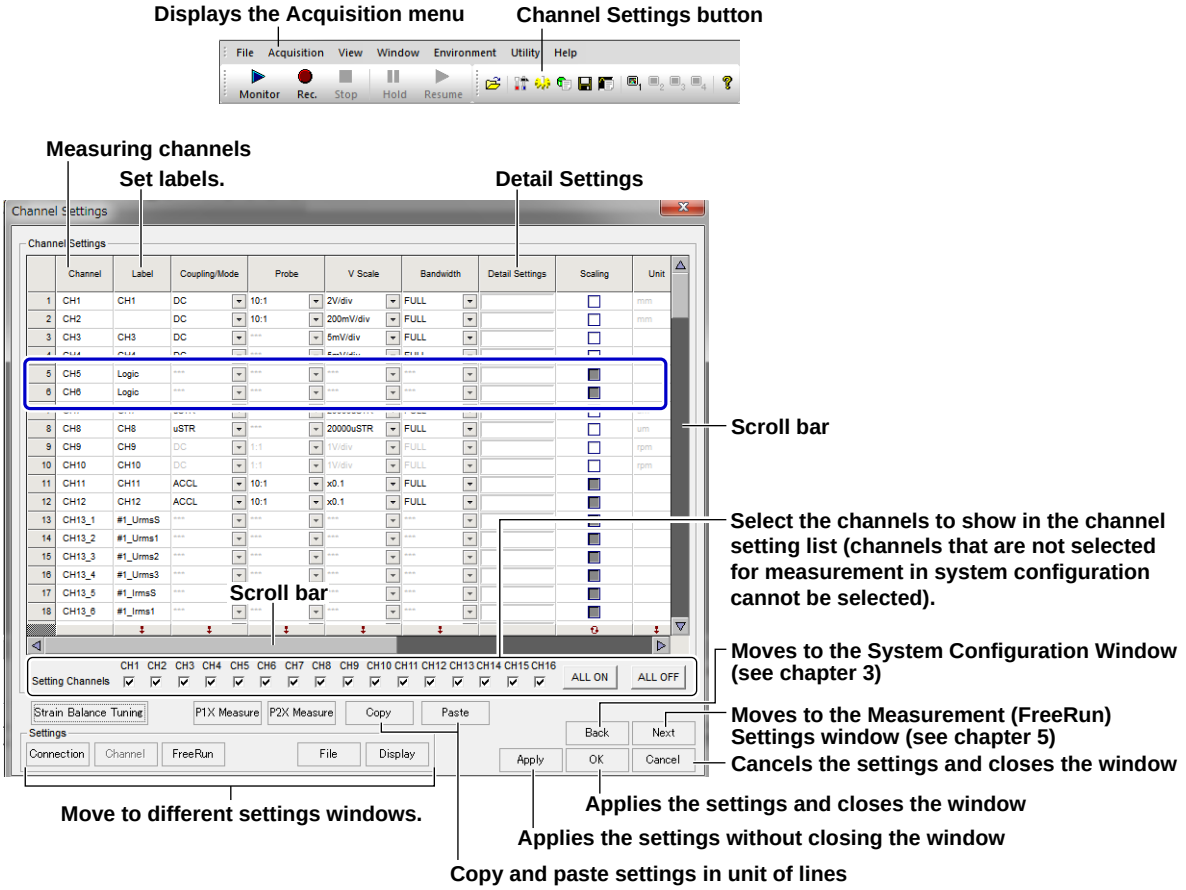
Setting the Unit

Set the velocity unit using up to four characters. The default value is m/s.

4.6 Measuring Logic Signals

Set the measurement conditions for measuring the logic signals on the Logic Input Module (720230). For details on the settings, see the DL850E/DL850EV User's Manual.

1. Click the **Channel Settings button**, or click **Channel Settings** on the Acquisition menu.



Measuring Channels

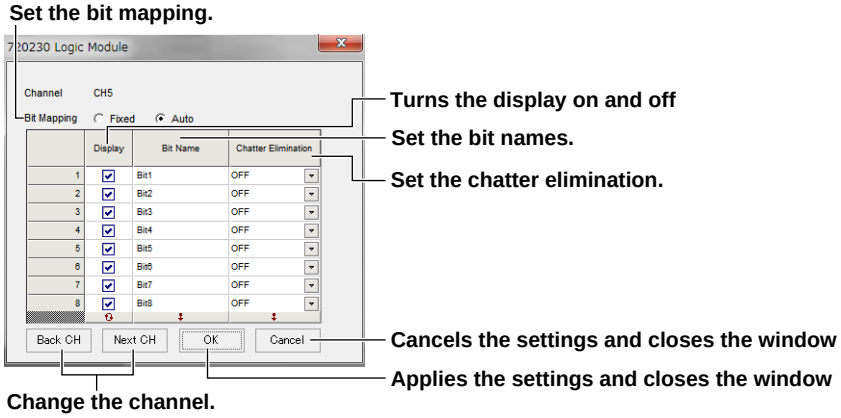
The measuring channel numbers that have been set to measure in the System Configuration window appear.

Labels (Measuring Channel Names)

You can assign names to measuring channels. Click the Label box of the measuring channel you want to name to display the text cursor or to highlight the existing name. Then, type the name. You can specify up to 16 characters for the name. By default, the channel number of the DL850E/DL850EV slot is assigned for the name.

The channel names specified here are used in setting the waveform display conditions and on the waveform window.

Detail settings



Bit Mapping

Select from the following:

Fixed: Space is provided even for bits that are hidden.

Auto: Space is not provided for bits that are hidden. Only the bits that are shown are displayed in order from the top.

Turning the Bit Display On and Off

Select whether to show or hide the waveform of each bit.

Bit Name

You can assign bit names using up to 16 characters to be displayed.

Chattering Elimination

Select whether to eliminate chattering for each bit. When eliminating chattering, set the elimination time.

OFF (not eliminate chattering), 5msec, 10msec, 20msec, 50msec, 100msec

4.7 Monitoring CAN Bus, LIN Bus, or SENT Signals (DL850EV)

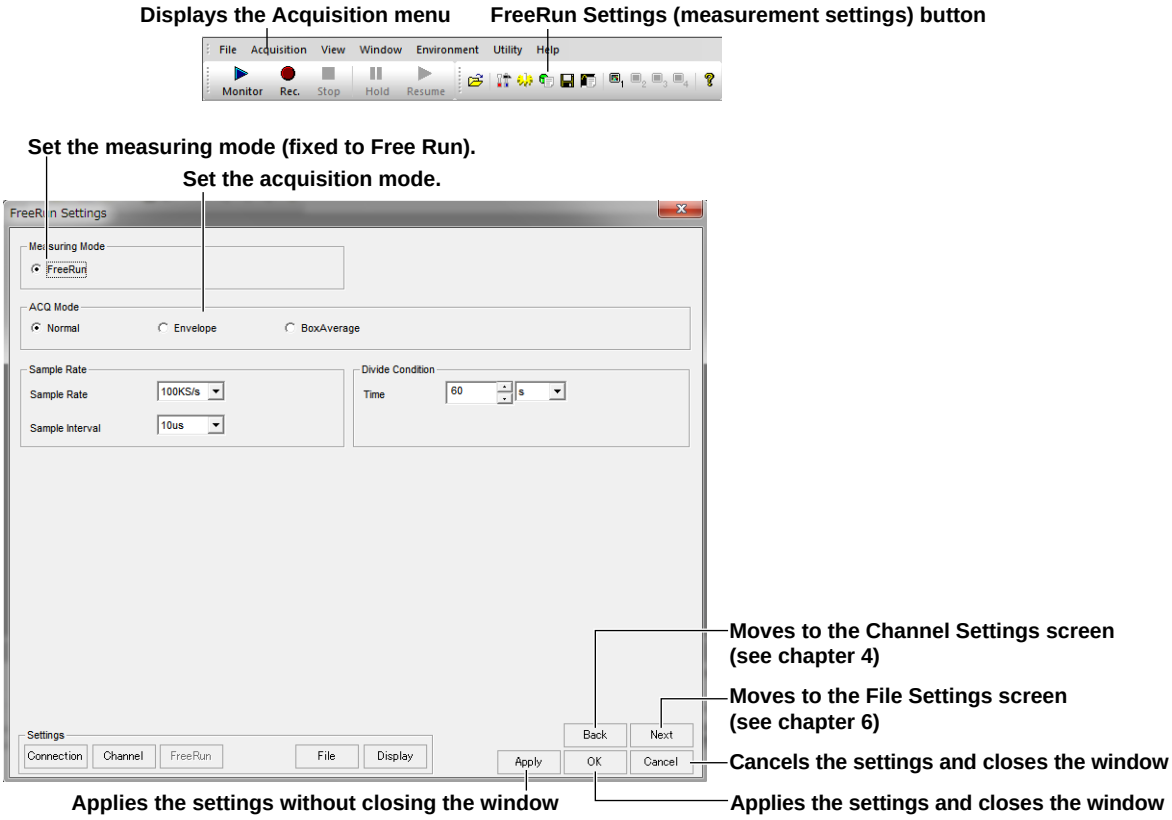
When monitoring CAN bus, LIN bus, or SENT signals using a CAN Bus Monitor Module (720240), CAN & LIN Bus Monitor Module (720241), CAN/CAN FD Monitor Module (720242), or SENT Monitor Module (720243), this software can only be used to set the channel labels.
For other settings, configure them from the DL850EV.
For details on the settings, see the DL850EV User's Manual (IM DL850E-01EN or IM DL850E-02EN).
YOKOGAWA's free software Symbol Editor is convenient for setting CAN bus or LIN bus signals. You can download Symbol Editor from YOKOGAWA website.

4.8 Monitoring Power Math and Real Time Math Waveforms

When monitoring power math waveforms (/G5 option) or real time math waveforms (/G3 option) on the DL850E/DL850EV, this software can be used only to set the labels of channels. For other settings, configure them from the DL850E/DL850EV.
For details on the settings, see the DL850E/DL850EV User's Manual (IM DL850E-51EN).

5.1 Setting the Measuring Mode and Acquisition Mode

1. Click the **FreeRun Settings** (**measurement settings) button**, or click **FreeRun Settings** on the Acquisition menu.



Setting the Measuring Mode

This is fixed to Free Run.

Free Run: Acquires data at the same time measurement is started and continues to acquire data until the measurement is stopped.

Setting the Acquisition Mode

Select Normal, Envelope, or Box Average.

For details on each mode, see the DL850E/DL850EV User's Manual, IM DL850E-01EN, (pdf file).

Normal Mode

Sampled data is stored in the acquisition memory without special processing.

Envelope Mode

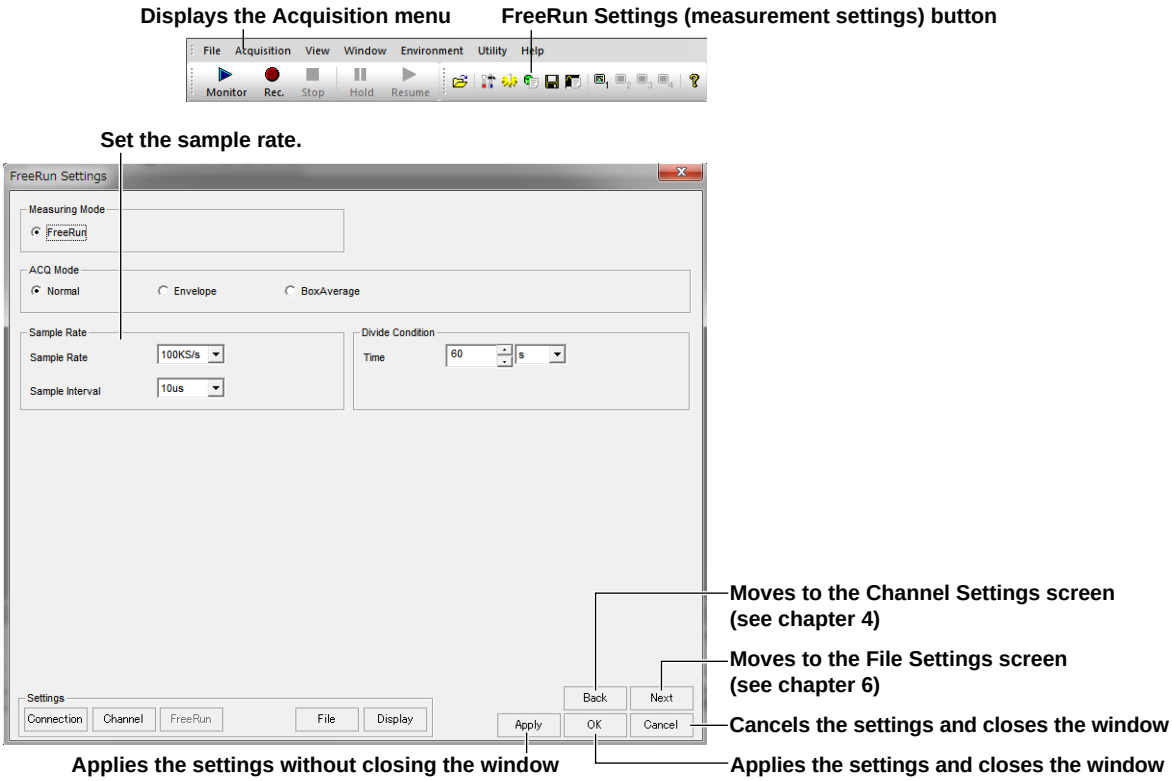
The DL850E/DL850EV determines the maximum and minimum values among the data sampled at the maximum sample rate for each module at a time interval that is twice the sampling period (the inverse of the sample rate) of Normal mode, saves the values as pairs in the acquisition memory, and uses the saved value pairs to display the waveforms.

Box Average Mode

The DL850/DL850V determines the moving averages of the data sampled at the maximum sample rate, saves them to the acquisition memory, and uses them to display waveforms. This mode is available on the 701250, 701255, 720210, 720211, and 720250 modules.

5.2 Setting the Sample Rate

1. Click the **FreeRun Settings** (**measurement settings) button**, or click **FreeRun Settings** on the Acquisition menu.



Setting the Sample Rate and Sample Interval

Set the sample rate or sample interval. Setting the sample rate automatically sets the corresponding sample interval and vice versa.

The sample rate or sample interval can be determined from the following equation.

Sample rate = 1/sample interval

You can select the sample rate (sample interval) from 1 MS/s (1 µs), 500 kS/s (2 µs), 200 kS/s (5 µs), 100 kS/s (10 µs), 50 kS/s (20 µs), 20 kS/s (50 µs), 10 kS/s (100 µs), 5 kS/s (200 µs), 2 kS/s (500 µs), 1 kS/s (1 ms), 500 S/s (2 ms), 200 S/s (5 ms), 100 S/s (10 ms), 50 S/s (20 ms), 20 S/s (50 ms), 10 S/s (100 ms), and 5 S/s (200 ms).

Note

- When you confirm a new sample rate (by clicking OK, Next, or Back) in Free Run mode, the previous measured data in the memory and the waveform display are cleared.
- If a module with sub channels (720220, 720221, 720240, 720241, 720242, 720243, or 720254) is installed or if power analysis is enabled, 50 S/s to 5 S/s may not be selectable depending on the settings.

Number of Measuring Channels and Sample Rate

The maximum sample rate varies depending on number of measuring channels.

No. of Measuring Channels	Maximum Sample Rate
1	1 MS/s
2 or 3	500 kS/s
4 to 8	200 kS/s
9 to 16	100 kS/s

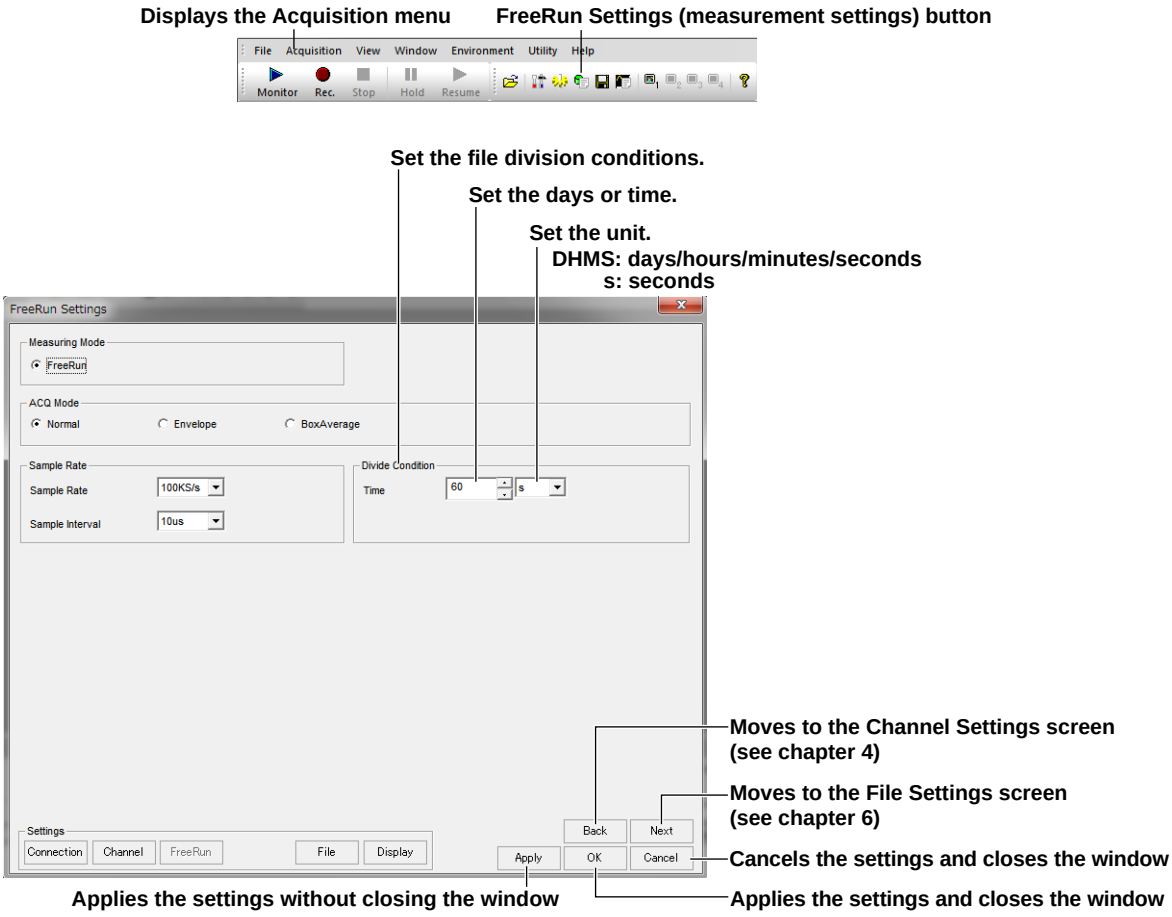
No.of Measuring channels do not include subchannels.

Maximum Sample Rate of Each Module

If you set the sample rate to a rate that is higher than a module's maximum sample rate, because the data is only updated at the module's maximum sample rate, all the data within the module's data update interval will be the same. For the maximum sample rate of each module, see the DL850E/DL850EV User's Manual.

5.3 Setting Division Conditions

1. Click the **FreeRun Settings** (**measurement settings) button**, or click **FreeRun Settings** on the Acquisition menu.



Time

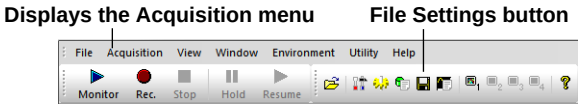
Performs recording by dividing the file at specified time intervals. The time interval cannot be set to a value that would cause the file size to exceed 2 GB.

File Name

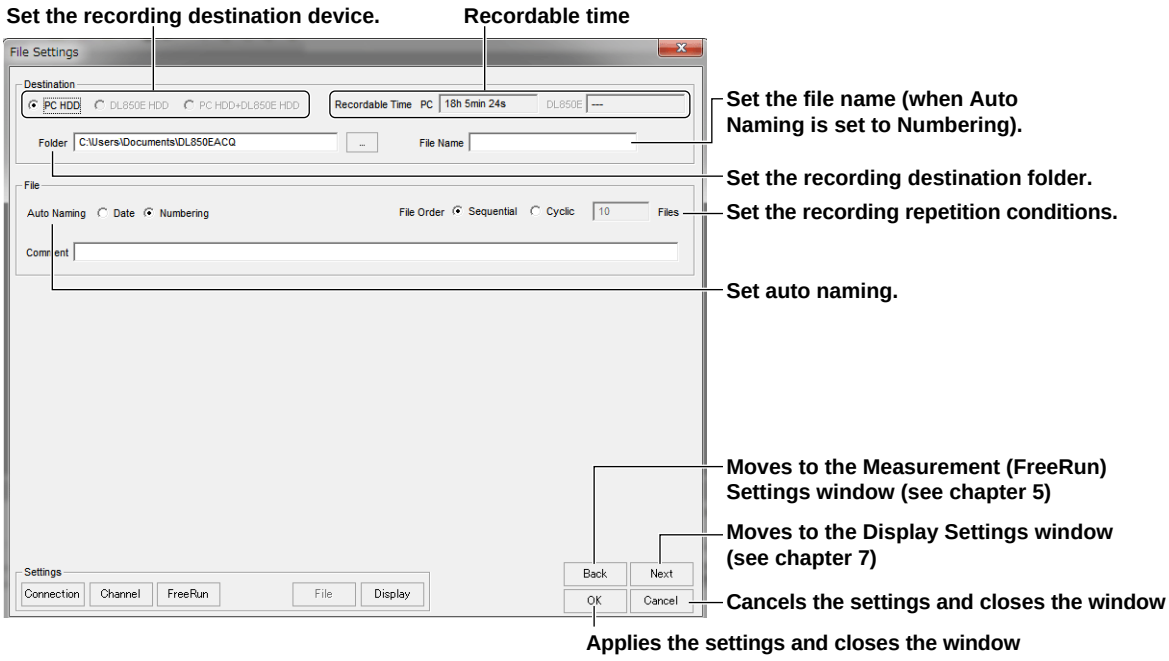
If sequence numbers are used for the file names, the number increases by 1.
If dates are used for the file names, the file name is set to the date and time when the file is divided.
For details on file names, see section 6.1.

6.1 Recording Measured Data

1. Click the **File Settings button**, or click **File Settings** on the Acquisition menu.



The File Settings window appears.



Destination

Set the data recording destination.

PC HDD: Records to the hard disk of the PC in which this software is installed.

DL850E HDD: Records to the DL850E/DL850EV internal hard disk.

PC HDD+DL850E HDD: Records both to the PC hard disk and the DL850E/DL850EV internal hard disk.

The DL850E/DL850EV internal hard disk is an option. DL850E HDD and PC HDD+DL850E HDD are valid on models with this option.

Folder

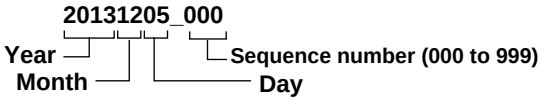
Set the recording folder on the PC hard disk. You do not have to set the folder, if you are recording only to the DL850E/DL850EV internal hard disk.

Click **...** to open a dialog box for browsing folders.

By default, data is recorded to the DL850EACQ folder that is created in My Documents.

Measured data is saved to a folder named according to the date within the folder specified here.

The folder name is the date followed by a sequence number. The same date folder name is used both on the PC and the DL850E/DL850EV.



A folder can contain up to 1000 files. If the number of files exceeds 1000, a new folder with an incremented sequence number is created. However, if File Order is set to Cyclic, the specified number of files can be saved even if the number of files exceeds 1000.

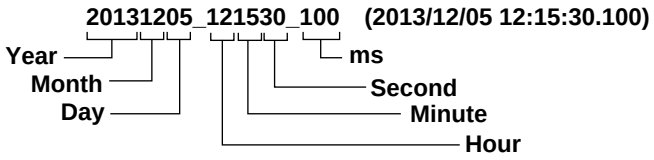
Name

Set the file name. A sequence number is automatically appended to the specified file name. You do not have to set the name if you are using the date for auto naming.

Auto Naming

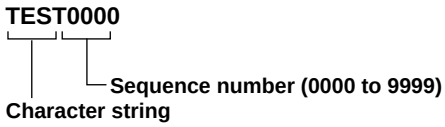
To Use the Date/Time in the File Name

The date/time (ms unit) of the recording is used for the file name. A specific file name cannot be specified. You cannot use this function when File Order is set to Cyclic.



To Use a Sequence Number in the File Name

A sequence number is added to a file name that you specify.



File Order

You can limit the number of files that are recorded to the specified destination.

Sequential: Records files until there is no more free space on the destination hard disk. When the number of files in one folder exceeds 1000, the files are recorded to a new folder.

Cyclic: You can specify the number of files to be recorded to the destination hard disk. If the number of files reaches this number, recording continues by overwriting the oldest files. Set the number of files in the range of 1 to 1000. File names only take on sequence numbers.

Note

In Cyclic mode, files are numbered from 0000 each time you start recording. Therefore, old files with the same name are overwritten. If you want to keep the old files, select Sequential.

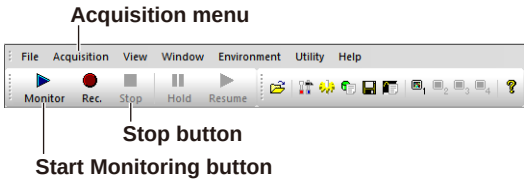
Comment

Enter any necessary comments using up to 250 characters.

6.2 Starting and Stopping the Monitor Operation (Measure)

Starting the Monitor Operation

Click the **Monitor button** on the toolbar, or click **Start Monitor** on the Acquisition menu. The DL850E/DL850EV starts measuring, and waveforms are displayed on the software window.



When measurement is started, data is acquired in the internal memory of the DL850E/DL850EV. When waveform display is enabled, the waveforms are displayed.

Note

- Even when measurement is started, measured data is not recorded to the hard disk of the DL850E/DL850EV or PC.
- Recording cannot be started while monitoring is in progress. To record measured data, stop monitoring once, and start recording.

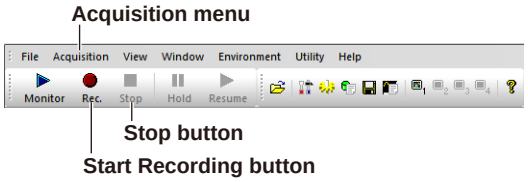
Stopping Monitoring

Click the **Stop button** on the toolbar, or click **Stop** on the Acquisition menu. Measurement will stop.

6.3 Starting and Stopping the Recording Operation

Starting the Recording Operation

Click the **Rec button** on the toolbar, or click **Start Recording** on the Acquisition menu. Measured values are recorded to the specified destination.



Note

Recording cannot be started while monitoring is in progress. To record measured data, stop monitoring once, and start recording.

Stopping the Recording Operation

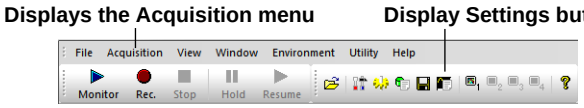
Click the **Stop button** on the toolbar, or click **Stop** on the Acquisition menu. Recording will stop.

7.1 Setting Display Conditions

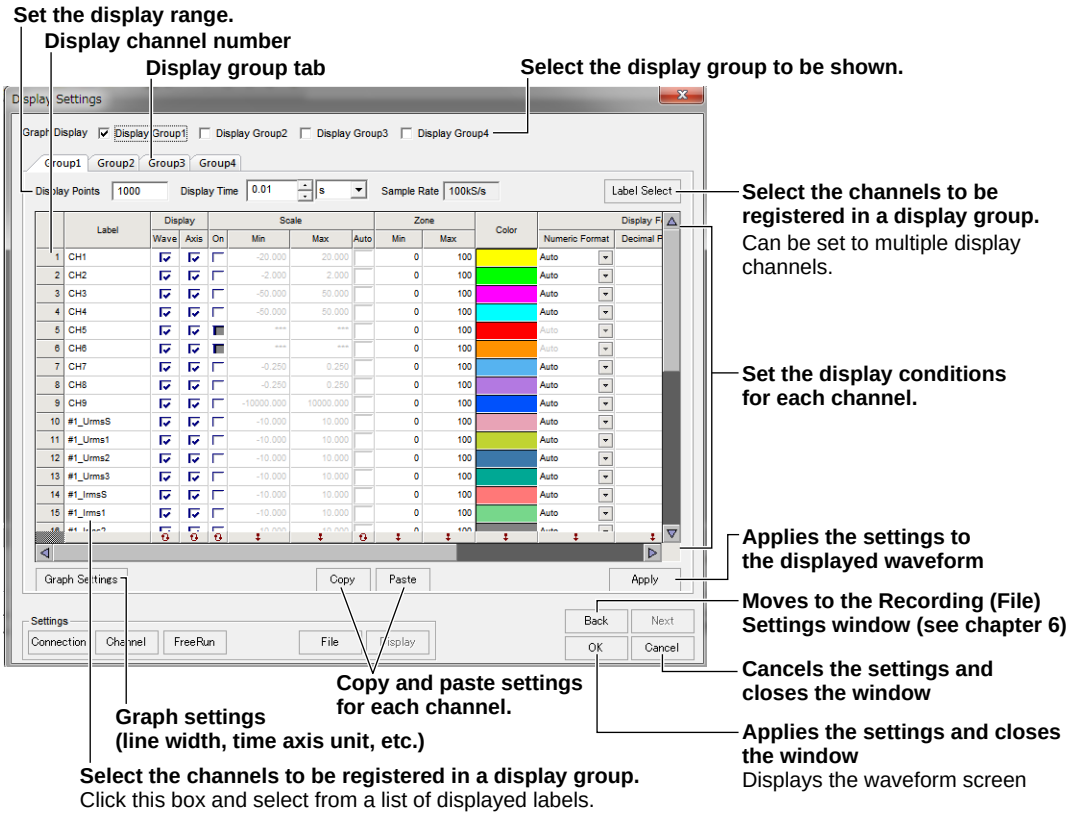
The Acquisition Software can display the measured waveforms of channels registered to display groups. There are settings that apply to all display groups and settings that apply to individual channels.

Setting Display Groups

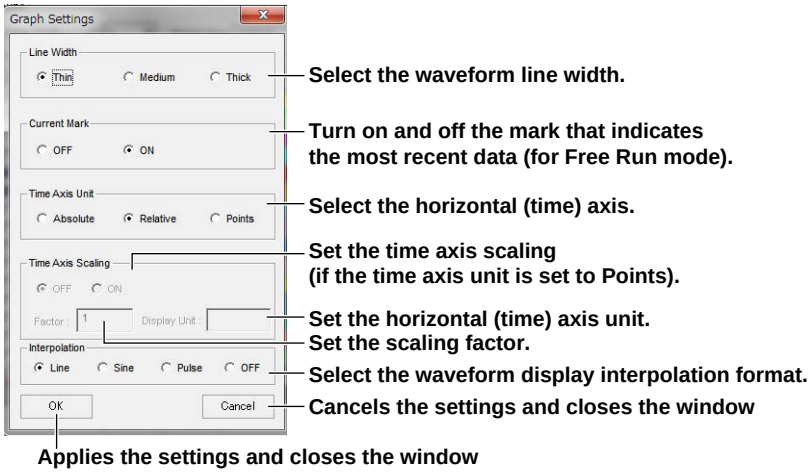
1. Click the **Display Settings button**, or click **Display Settings** on the Acquisition menu.



The Display Settings window appears.



Graph Settings



Setting the Display Range (for Free Run mode)

To measure in Free Run mode, you must set the X-axis range to be displayed.
Set the range in terms of the display time or the number of displayed points.
The maximum sample rate among the channels registered to the display group is displayed on the setting window.

Setting the Display Time

Set the display range of the X-axis in the following range.

Longest sample interval × 10 to M/fastest sample rate

Longest sample interval: The longest sample interval within the same display group

M: 4004000 (standard model)
16016000 (/M1 model)
32032000 (/M2 model)

The resolution is equal to the longest sample interval × 10.

Setting the Number of Displayed Points

Set the display range of the X-axis in terms of the number of data points.

Graph Settings

Set the following items.

Line Width

Set the waveform line width to Thin, Medium, or Thick.

Current Mark (Free Run Mode)

Set whether to display a mark that indicates the most recent measured data.

Time Axis Unit

Set whether to display the time axis in absolute time, relative time from the start of the measurement, or using the number of displayed points.

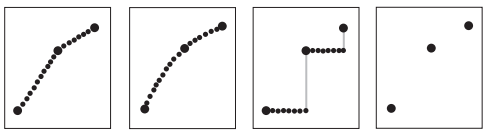
Time Axis Scaling (When the Time Axis Unit Is Set to Points)

Set whether to scale the time axis display. If scaling the display, set the factor per displayed point as well as the display unit. Set the factor in the range of 0.001 to 1000. Set the display unit using up to 10 characters.

Interpolation

Set the interpolation format used to connect sampled data points for displaying the waveform.

Line: Interpolates between two points using a straight line.
Sine: Interpolates between two points using the sin x/x function.
Pulse: Interpolates between two points in a staircase pattern.
Dot: Does not perform interpolation.



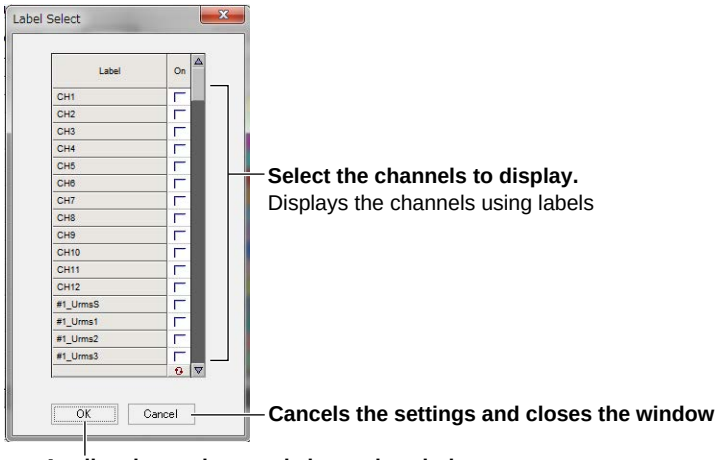
Line Sine Pulse Dot

Registering the Displayed Channels

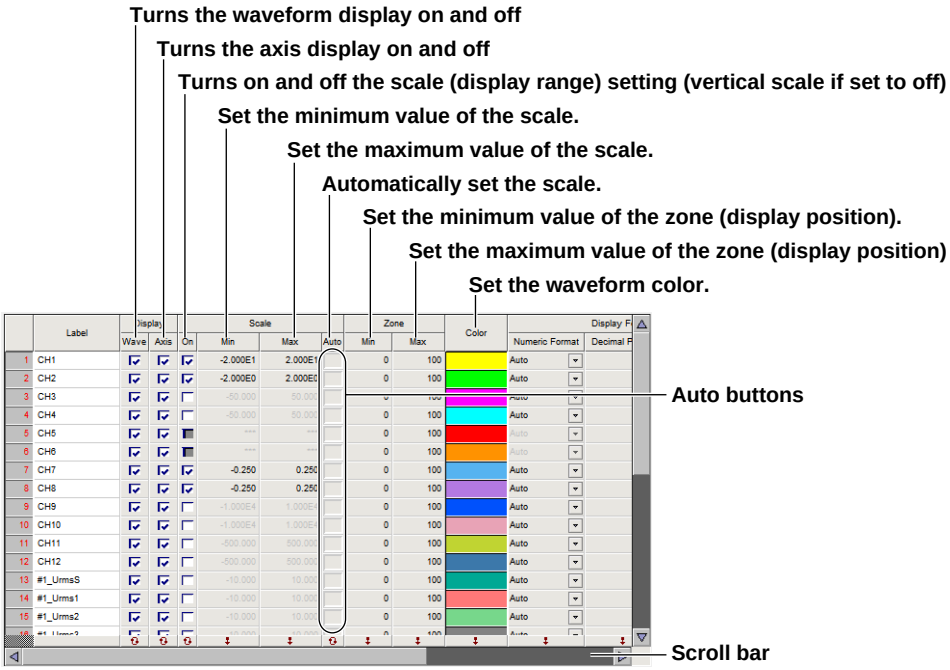
Clicking a label box shows a list of labels of the measuring channels. Select any of the measuring channels. The label list shows the label names specified in the measurement settings. You can register up to 32 measuring channels.
The same measuring channel can also be registered to multiple display groups.
To not register a measuring channel, select None from the label list.

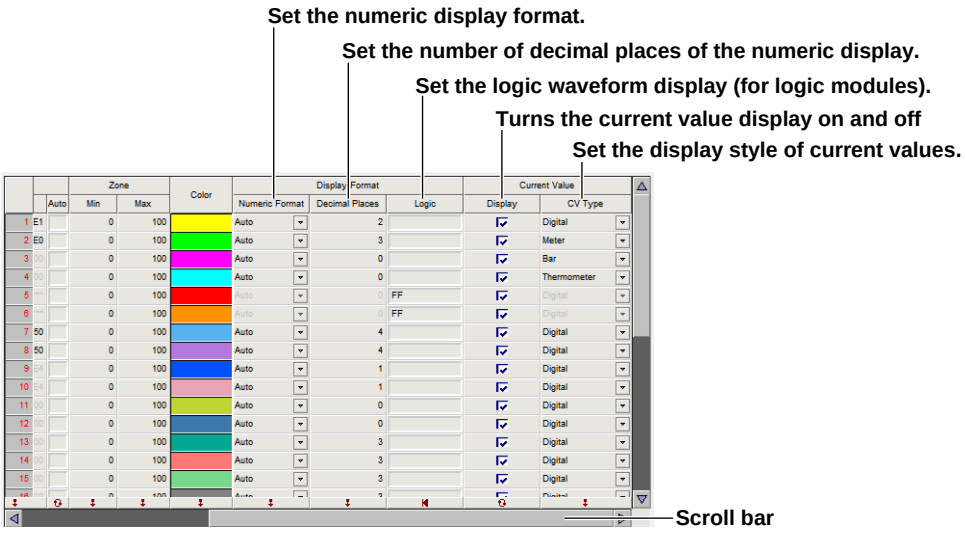
Selecting the Labels to Display

Click Label Select to show a list of labels for the measuring channels that are registered. Select a measuring channel from the list of labels that appears. Then, click OK to assign the selected label to the selected display channel. Select multiple labels to assign them to the selected display channel and its subsequent channels. You can also turn the labels on and off for all channels collectively.



Setting Each Channel





Turning ON/OFF the Waveform Display and Axis Display

Set whether to show or hide the waveforms and coordinate axes of channels registered to display groups.

Setting the Scale

Set the scale (display range of the vertical axis).

Turning the Scale ON/OFF

Select the On check box to set the scale. If the check box is not selected, the vertical scale becomes the display range.

Minimum and Maximum Values of the Scale

These values can be set when the scale is ON. The selectable range is –1E+30 to 1E+30.

Automatically Setting the Scale

Click the Auto button to automatically set to the scale best suited to the measured data.

Setting Zones

Set the zones (display positions). You can display waveforms so that they don't overlap or move the waveforms to positions that allow easy comparison.
The settings specified here are valid when waveforms are displayed using User Zone or Edit Zone on the waveform window. For details on User Zone and Edit Zone, see section 7.2.

Minimum and Maximum Values of Zones

Set the minimum and maximum values of zones as a percentage of the vertical span of the waveform window.

Note

You can also set zones easily by using buttons on the waveform screen. For details, see section 7.2.

Setting the Waveform Color

The color of the waveform on the DL850E/DL850EV screen appears.
Clicking a color box opens a color dialog box. You can set any color.

Setting the Display Format

Set the numeric display format.

Numeric Format

Select Floating, Exp, Hex, or Auto.

For logic waveforms, this is fixed to Auto.

Decimal Places

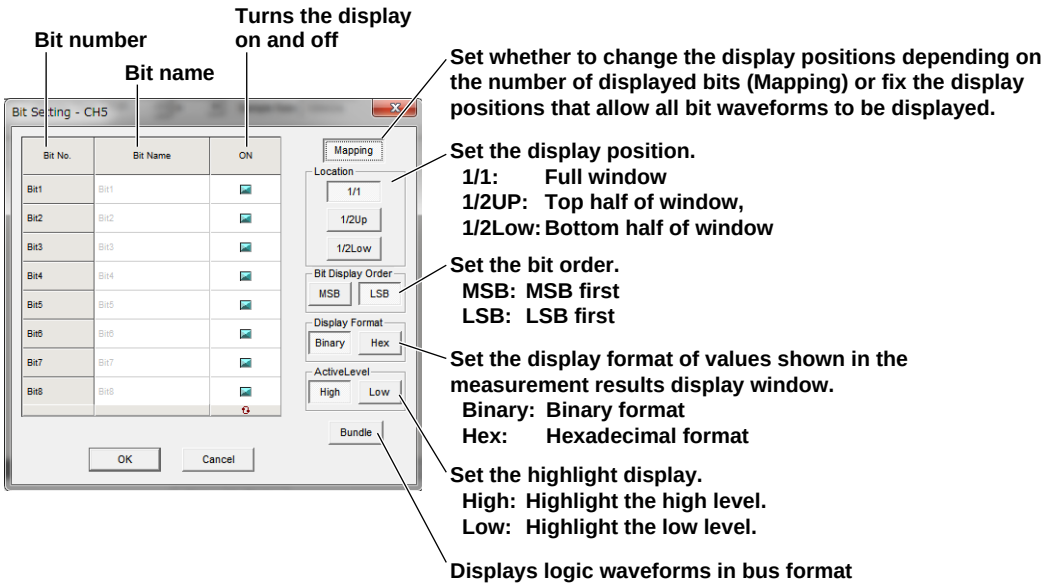
Set the number of decimal places.

This is not available for logic waveforms.

Logic Waveform Display

This is available only for logic waveforms.

Clicking a Logic box opens a Bit Setting dialog box.



Current Value

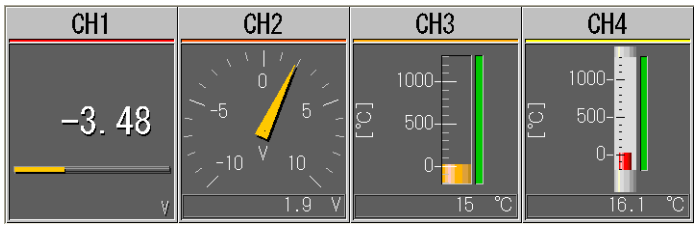
Current values can be displayed at the same time as waveforms.

Turning the Display ON/OFF

Turn on or off the current value display.

CV Type

Set the display style of current values to Digital, Meter, Bar, or Thermometer.

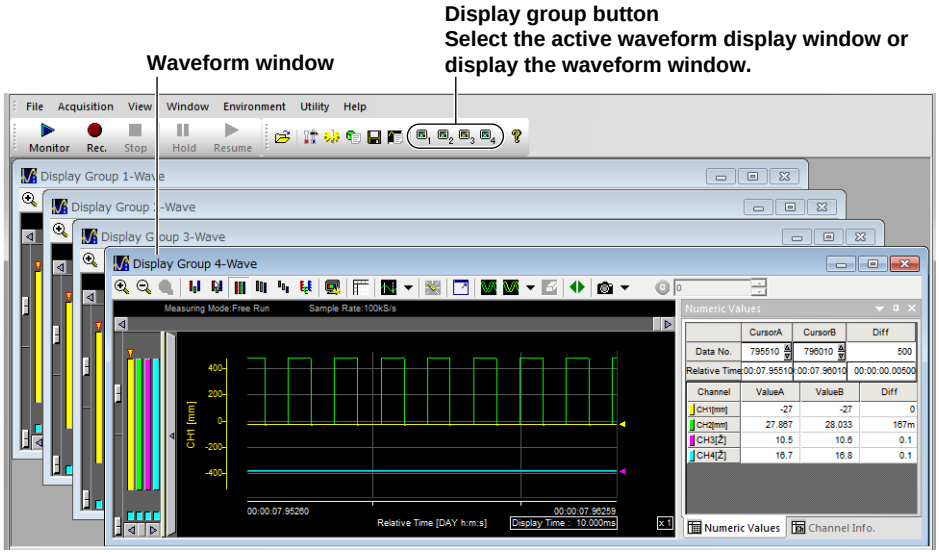


Digital Analog meter Bar graph Thermometer

7.2 Operating the Windows

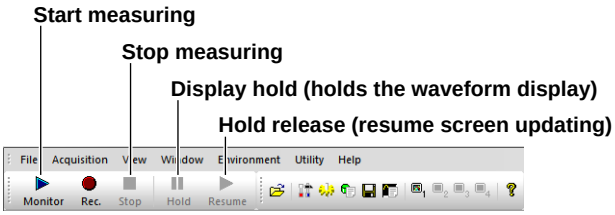
Displaying the Waveform Windows

Clicking OK on the Display Settings window in section 7.1 and starting monitoring or recording shows the waveform windows of display groups whose Graph Display check box is selected.
To show a waveform window that is not shown, click the corresponding display group button on the toolbar.



Display Updating

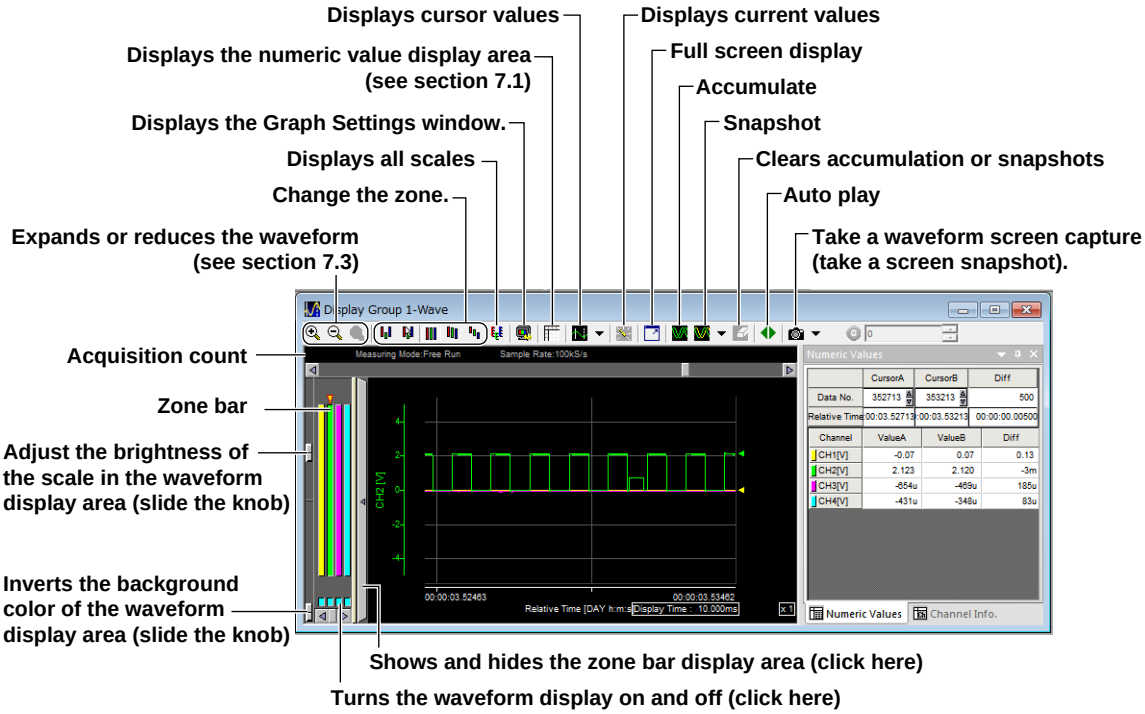
When measurement is started, the waveforms of channels registered to display groups are shown. You can stop and resume the display updating by clicking the Display Hold and Display Resume buttons, respectively. You can read measured values using cursors and view past waveform data while the display is held.



Note

- The data continues to be acquired to the internal memory of the DL850E/DL850EV even if the display is held.
- When the display is held, the displayed data may be overwritten, because the DL850E/DL850EV continues to measure data during this period. If this happens, the display hold feature will be automatically canceled.
- Display hold is valid when the sample rate is 100 kS/s or less.
- The display update may slow down during auto recording, because the recording operation takes precedence.

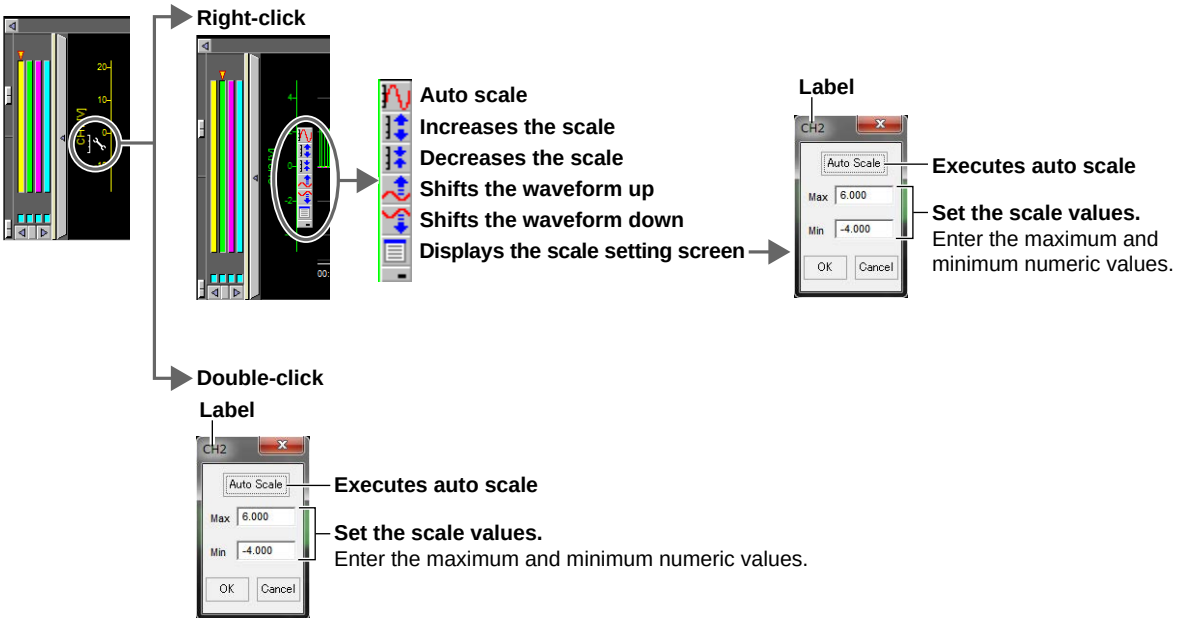
Operating Waveform Windows



Changing the Display Scale in the Window

You can change the display scale in a window while measurement is in progress or when measurement is stopped.

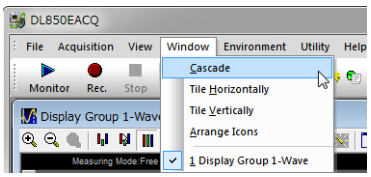
Place the cursor over the scale in the window so that the icon appears. Right-click to display the scale adjustment tool buttons, or double-click to display the scale setting screen.



Displaying Multiple Display Groups

When displaying waveforms of multiple display groups, you can cascade the windows of each display group or tile them.

On the Window menu, click Cascade, Tile Horizontally, or Tile Vertically. The Window menu appears when a waveform window is displayed.



Arranging Minimized Waveform Windows

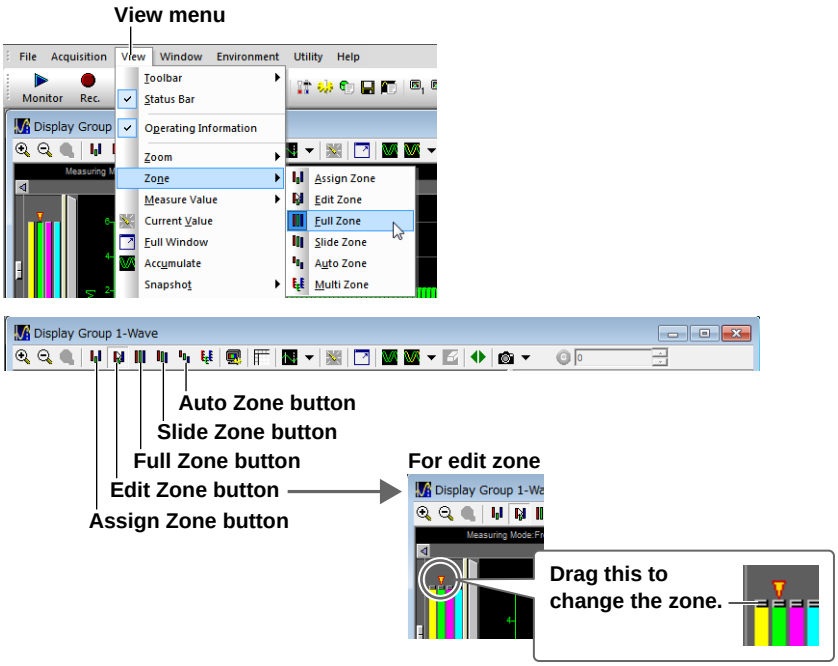
To arrange the minimized waveform windows, click Arrange Icons on the Window menu.

Changing Zones

To display waveforms using zones that have been specified in the display settings, click the **User Zone button**, or click **User Zone** on the **View** menu.

To change the zones specified in the display settings, click the **Edit Zone button**, or click **Edit Zone** on the **View** menu, and drag the top and bottom edges of the bars vertically. The zones that you change using Edit Zone are applied to the zones in the display settings.

Click the Full Zone button to display all waveforms in a full zone (0 to 100%). Click the Slide Zone button to display the slid waveforms. Click the **Auto Zone button**, or click **Auto Zone** on the View menu to display all waveforms so that they do not overlap. If Full Zone, Slide Zone, or Auto Zone is selected, the display settings are not affected.



Displaying All Waveforms Overlapped

To display all scales, click the **Multi Zone button**, or click **Multi Zone** on the **View** menu. The scale is displayed according to the display settings.

Multi Zone button

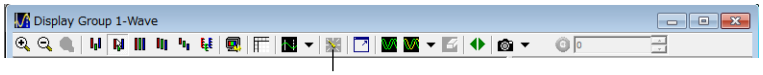
Selecting the Active Waveform

Click the bar of the waveform to be activated. A triangular mark is displayed above the bar, and the waveform is activated. The displayed scale is the scale of the active waveform.

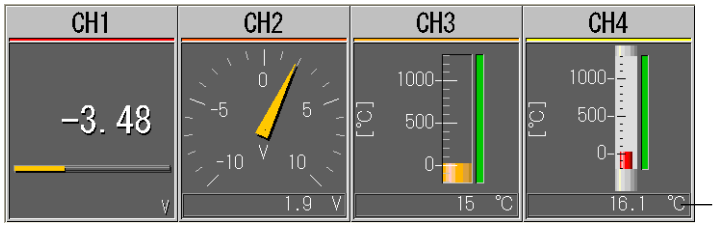
Active waveform mark

Displaying the Current Values

Click the **Current Value button** while the display is being updated. The current values are displayed.



Current Value button



Numeric display

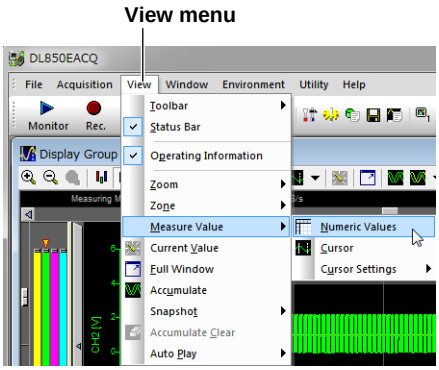
Digital **Analog meter** **Bar graph** **Thermometer**

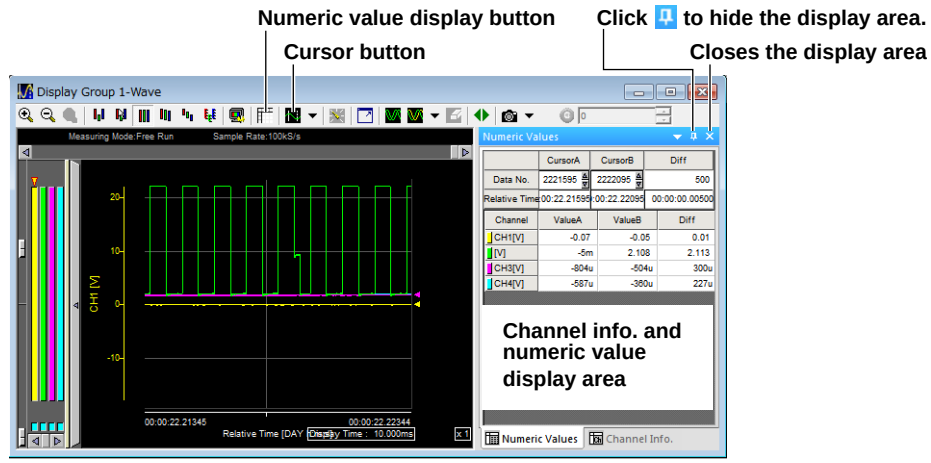
Displaying Channel Settings and Cursor Values

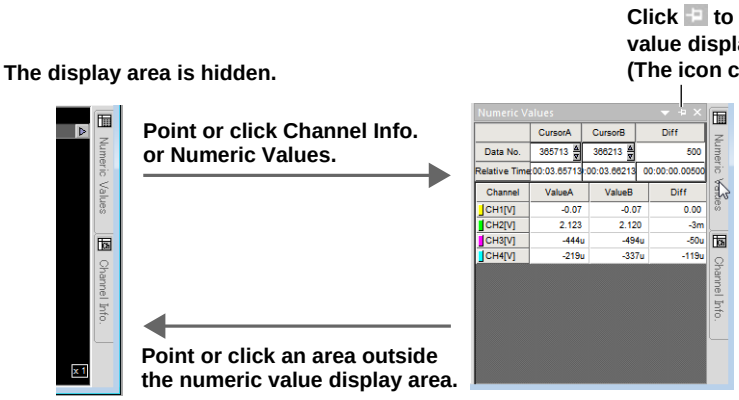
To show the area that displays channel settings and cursor values, click the numeric value display button, or click **Measure Value** > **Numeric Values** from the **View** menu.

To temporarily hide the display areas, click shown below. The Channel Info. and Numeric Values tabs appear at the right of the display frame. Place the pointer over these words to display the corresponding display area. If you move the pointer outside the display area, the display area closes. If you click Channel Info. or Numeric Values when the display area is hidden, the display area remains shown even when you move the pointer outside the display area. If you click a location outside the display area, the display area becomes hidden.

To switch between cursor values and measured waveform parameters when the numeric value display area is shown, click the **Cursor button** or **Numeric value display button**, or click **Cursor** or **Numeric Values** on the **View** menu.

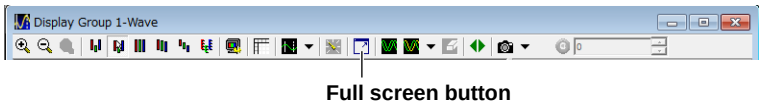






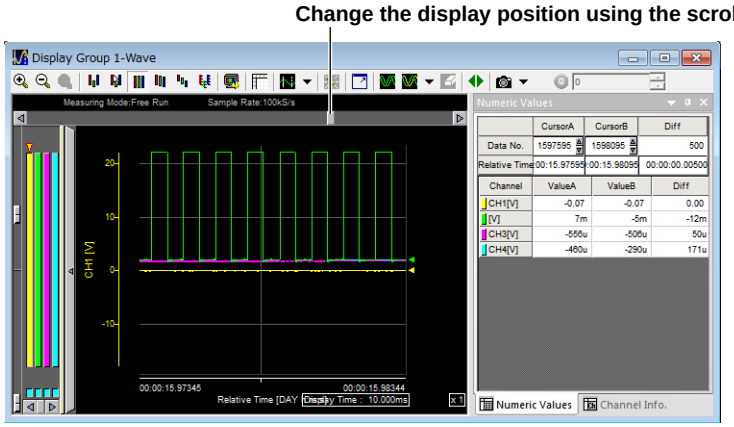
Changing the Size of the Window

Move the pointer over the window frame and drag when the pointer changes to an arrow.
To resize the window to full screen click the Full Screen button on the toolbar. Clicking the Full Screen button again when the screen is displayed in full screen causes the screen to return to its original size.



Displaying Past Data

When the display is held or measurement is stopped, you can display past data stored in the DL850E/DL850EV memory by changing the waveform display position. Moving the scroll bar of a waveform screen changes the position of the displayed waveform and displays the past waveform. Move the scroll bar to the left to view older data and to the right to view newer data.
In Free Run mode, you can go back as far as the oldest data stored in the DL850E/DL850EV memory.

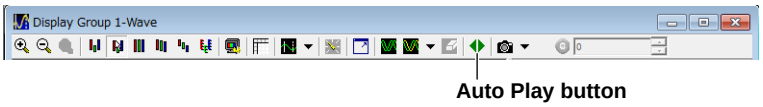


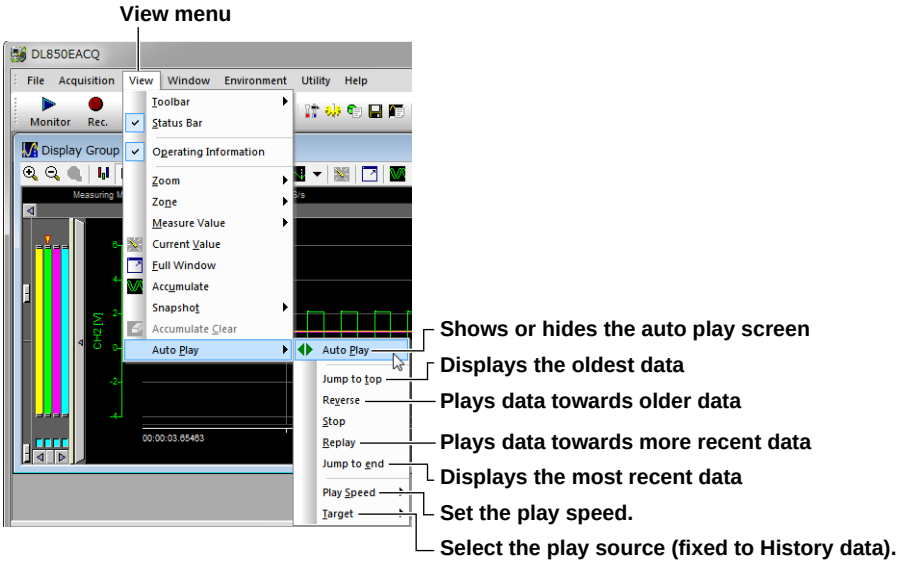
Scrolling Automatically

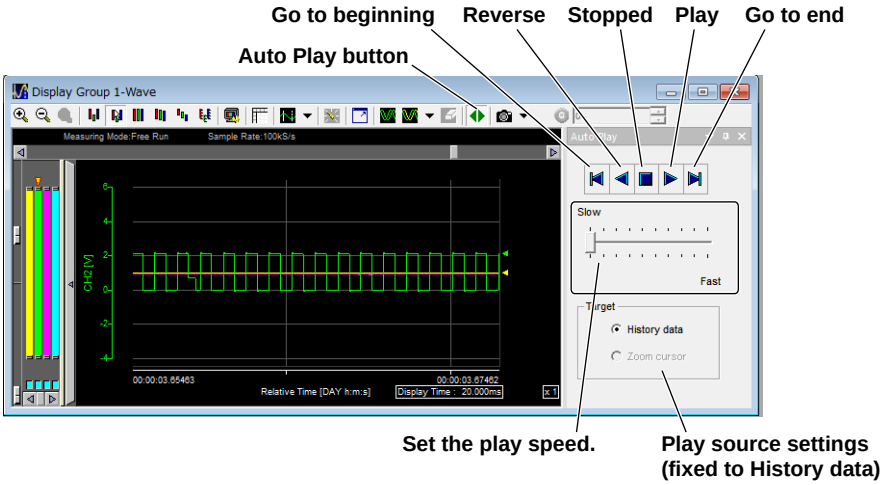
When measurement is stopped, the DL850E/DL850EV can scroll the waveform display position automatically.

Click the **Auto Play button**, or click **Auto Play** > **Auto Play** on the **View** menu.

The auto play screen appears.

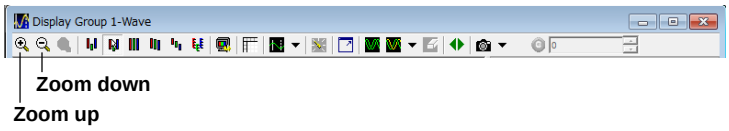


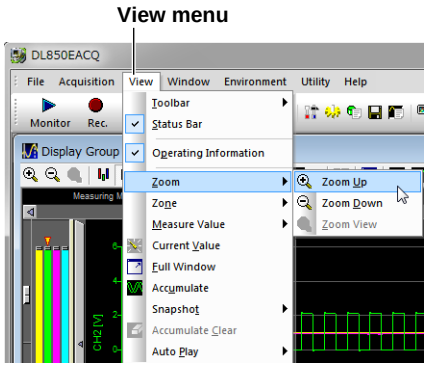




7.3 Expanding and Reducing (Zooming) Waveforms

The displayed waveforms can be expanded or reduced.
To expand or reduce waveforms along the time axis in a waveform window, click the **Zoom Up** or **Zoom Down button**, or **Zoom** > **Zoom Up** or **Zoom Down** on the **View** menu.





Note

You can use the mouse wheel to zoom up or zoom down the Free Run mode display time.

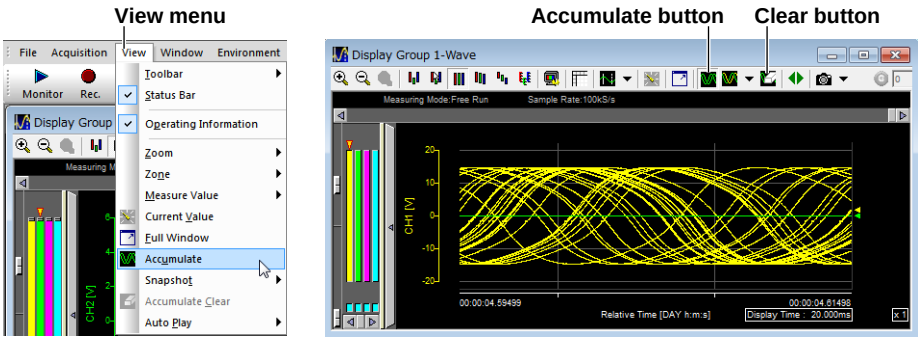
7.4 Accumulating Waveforms and Displaying Snapshots

You can use the accumulate display to accumulate waveforms and use snapshots to retain waveforms on the screen.

Accumulating Waveforms

After you start measurement, click the **Accumulate button**, or click **Accumulate** on the **View** menu. The most recent waveform is accumulated over the existing waveforms, which are not erased from the display.

To stop accumulation, click the **Accumulate button** again, or click **Accumulate** on the **View** menu.



Clearing Accumulated Waveforms

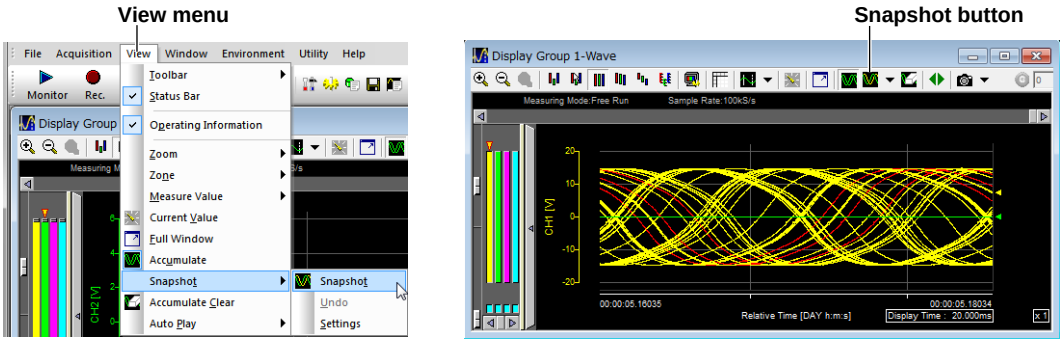
Click the **Clear button** to clear the accumulated waveforms.

Note

- If you click the Accumulate button and then automatically display waveforms from memory, you can accumulate past waveforms.
- You cannot adjust the window size while accumulated waveforms are displayed.
- If you change the waveform display area (for example, by turning the measurement display on or off) while accumulated waveforms are displayed, all accumulated waveforms will be cleared.

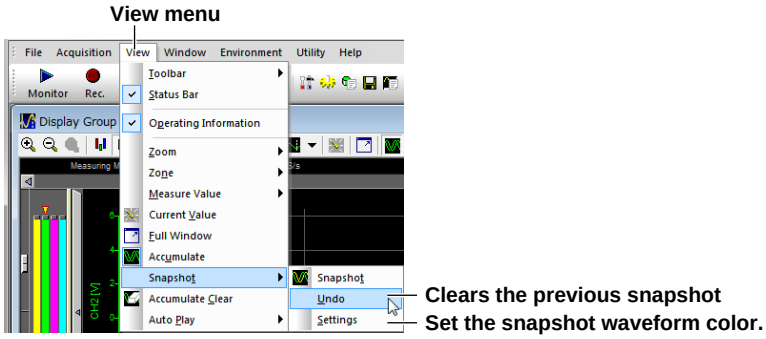
Taking Snapshots

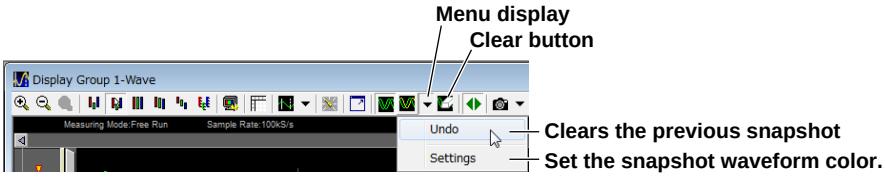
After you start measurement, click the **Snapshot button**, or click **Snapshot** on the **View** menu. The waveform that was displayed at the time that you clicked the Snapshot button is retained on the screen.



Clearing the Previous Snapshot

To clear a snapshot, click the arrow on the right of the Snapshot button, and click **Undo**. The most recent snapshot is cleared.





Changing the Snapshot Waveform Color

To change the snapshot waveform color, click the arrow on the right of the Snapshot button, and click **Settings**. Specify the color on the snapshot settings screen that appears.

Clearing Snapshot Waveforms

Click the **Clear** button to clear all of the displayed snapshot waveforms.

Note

- You cannot adjust the window size while snapshot waveforms are displayed.
- If you change the waveform display area (for example, by turning the measurement display on or off) while snapshot waveforms are displayed, all snapshot waveforms will be cleared.

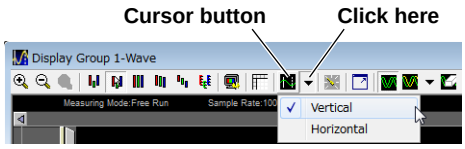
7.5 Reading Measured Values Using Cursors

When a waveform is displayed, you can use cursors to read measured values.

Selecting the Cursor Type

There are two types of cursors: vertical and horizontal.

1. Click the arrow on the right of the Cursor button.
   Select the cursor type from the displayed list.

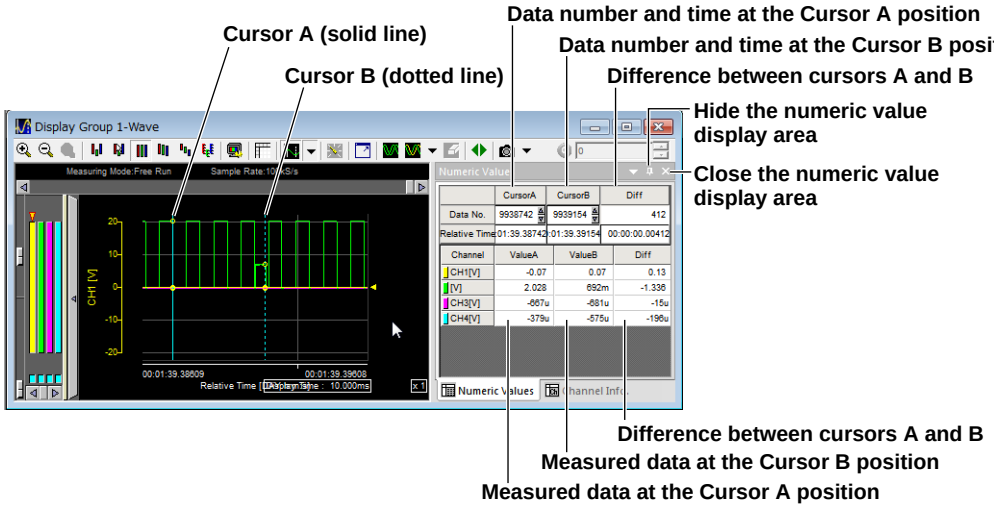


Displaying the Cursors

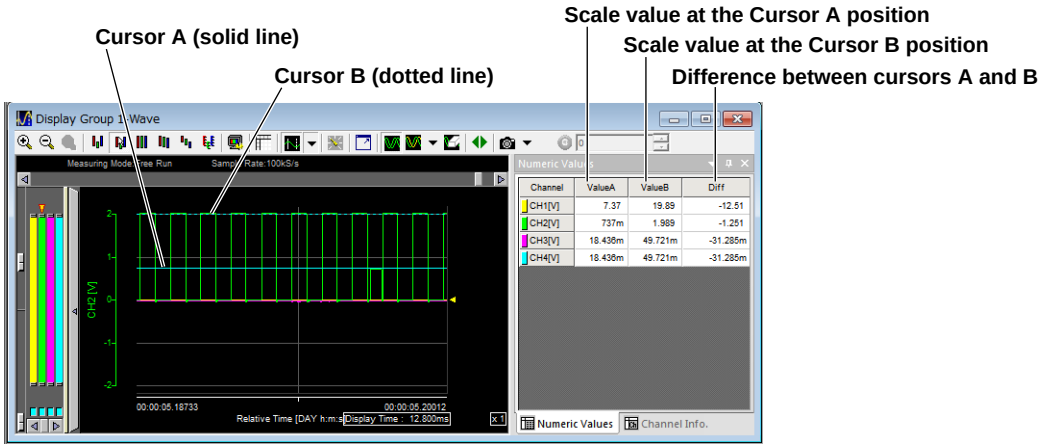
2. Click the **Cursor** button to display the cursors.

   To display cursor values, click the **Numeric Value Display button**.
   The cursor values are displayed to the right of the waveform screen.

Vertical Cursors



Horizontal Cursors



Note

To temporarily hide the numeric value display area, click the mark. The numeric value display area closes and the words “Numeric Values” and “Channel Info” appear on the display frame. Place the pointer over these words to display the corresponding display area. At this point the mark is changed to .
If you click , the icon changes to , tabs for switching between display areas appear at the bottom of the display area, and the selected display area remains displayed.

Moving the Cursors

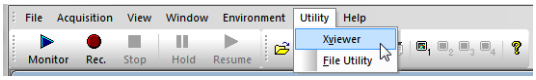
Move the cursors by dragging them. The cursors moves on the measured points.
Pressing the left and right arrow keys on your PC keyboard moves the cursor over the measured data one point at a time. This feature is useful if multiple data points exist within the time corresponding to a dot on the display, such as when measurement is performed at a fast sample rate.
If data measured at different sample rates is displayed in the same waveform screen, the cursor moves at the measured data interval of the active waveform. Be sure to activate a waveform when reading measured values from it using cursors. The active waveform is indicated by a triangular mark that is displayed above the zone bar.

Notes on Cursor Measurements

- If you measure at a sample rate that exceeds the maximum sample rate of a module, data cannot be acquired at the specified sample rate. The data at times when data cannot be acquired is set to the same value as the previous acquired data. Therefore, the measured value may not change even if you move the vertical cursor.
- If waveforms are displayed using Auto zone (see section 7.2), horizontal cursors cannot be used.

7.6 Starting Xviewer (Sold Separately)

You can use Xviewer, software sold separately, to display measured data that has been saved or perform calculations using measured data.
On the **Utility** menu, click **Xviewer**.
For information on how to use Xviewer, see the Xviewer user's manual.



Note

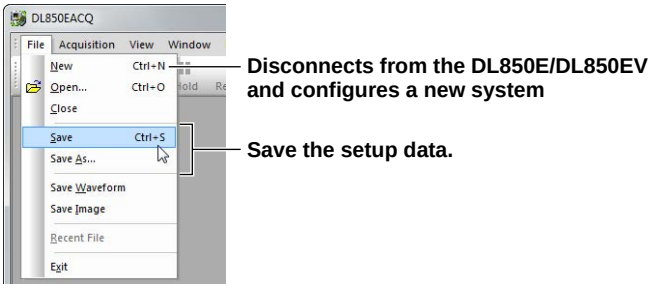
- If you double-click a file containing operating information, Xviewer will automatically start.
- You cannot connect both Ethernet and USB interfaces simultaneously to a DL850E/DL850EV. Therefore, Xviewer cannot connect to a DL850E/DL850EV that is connected to this software using USB.

8.1 Saving and Loading Setup Data

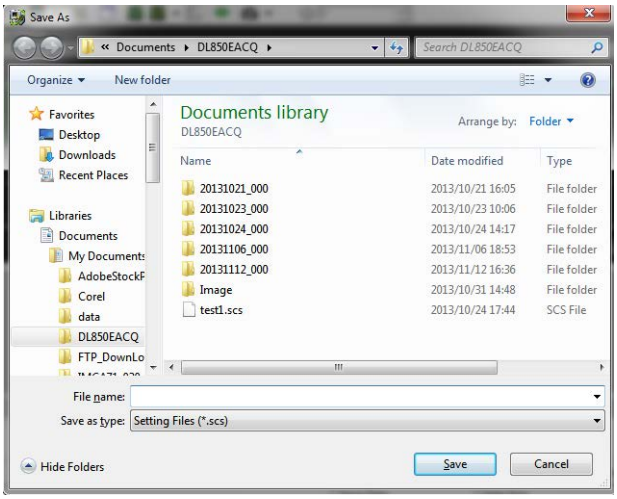
The settings of this software and the DL850E/DL850EV can be saved to a file. The saved data can be loaded to change the settings.

Saving Setup Data

On the **File** menu, click **Save As** or **Save**.



To save by specifying a name, set Save as type in the Save As dialog box to Setting Files (*.scs), and specify the destination and file name.



Loading Setup Data

On the **File** menu, click **Open**.

In the Open dialog box, select Setting Files (*.sls) in the Files of Type list, and specify the file you want to open.

If the settings of the selected setup file differ from those of the connected DL850E/DL850EV system, the settings cannot be loaded.

Nor can the settings be loaded if the connected DL850E/DL850EV is measuring or recording. Execute any of the corrective actions.

For details, see section 2.4.

The corrective actions are described below.

Corrective Action	Description
Get settings from the DL850E.	Discard the settings that were loaded and receive the settings from the DL850E/DL850EV. The measurement or recording on the DL850E/DL850EV continues.
Stop measuring and send settings to the DL850E/DL850EV.	If the DL850E/DL850EV is measuring or recording, the settings cannot be updated. Stop the measuring or recording and update the DL850E/DL850EV settings using the settings of this software.

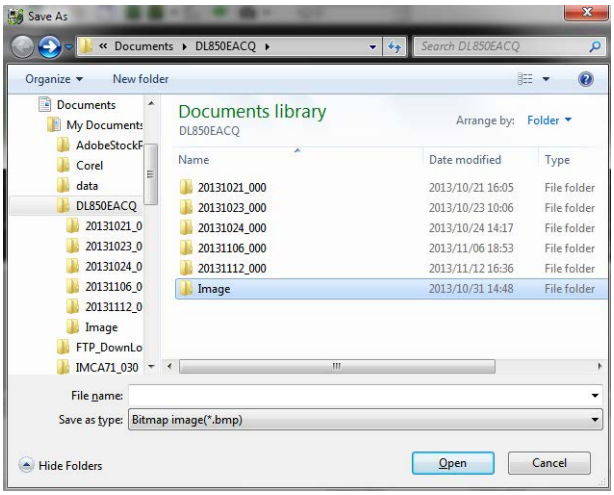
8.2 Saving Waveform Screen Captures

You can save screen captures of waveforms during measurement or after measurement is stopped. You can choose the command from the **File** menu or click the **Snapshot** button.

Saving Waveform Screen Captures

On the **File** menu, click **Save Image**.

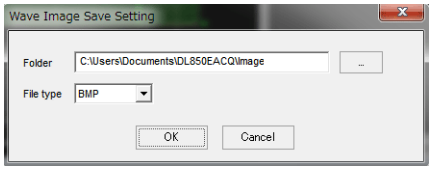
Set the file type to Bitmap Image (*.bmp) or PNG Image (*.png), and specify the destination and file name.



Taking a Snapshot with the Snapshot Button

1. Click the arrow on the right of the **Snapshot** button.

2. Set the file type to BMP or PNG, and specify the destination. The file will be named automatically.



3. Click the **Snapshot** button.

   Every time you click the Snapshot button from this point, the waveform screen capture is saved to the specified destination.

File Name

When you take screen captures using the snapshot button, a file name that consists of the display group number followed by a sequence number is automatically assigned to the saved files. When the sequence number exceeds 99999, it returns to 00000, and old data is overwritten.

D1_00000

Sequence number (00000 to 99999)

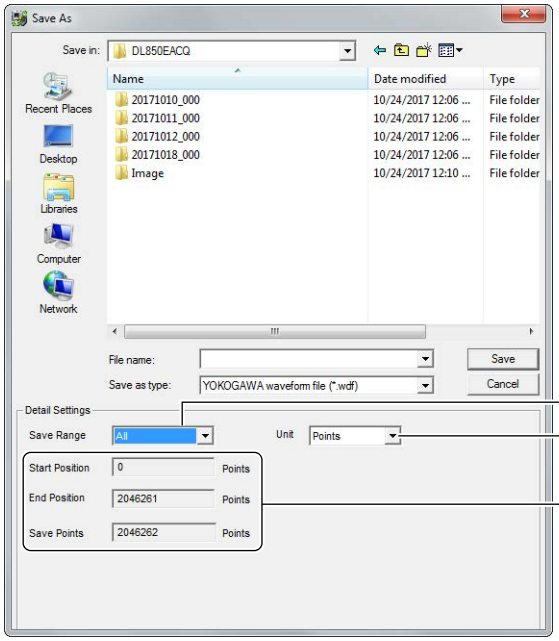
Display group number (D1 to D4)

8.3 Saving Waveform Data

Waveform data in the DL850E/DL850EV memory can be saved to a PC.

Setting the Save Destination and File Name

With the measurement stopped, on the File menu, click **Save Waveform**.
Specify the save destination and file name.
The file type is “Yokogawa waveform file (*.wdf).” You can view the waveforms with Xviewer, sold separately.

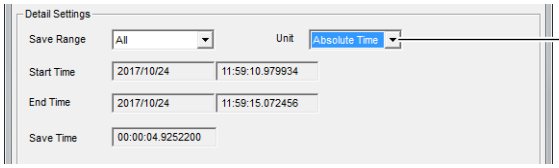


Select the save range.

Select the save range unit.
(Points, Absolute Time, Relative Time)

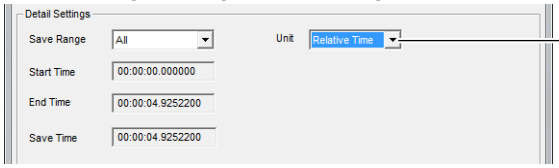
Save range information
(You can enter this when User is specified.)

When setting the range to save using absolute time



Select the save range unit.
(Set to Absolute Time.)

When setting the range to save using relative time



Select the save range unit.
(Set to Relative Time.)

Save Range

Select from the following.

- All: All waveform data saved in the DL850E/DL850EV memory are saved.
- Display: Waveform data in the displayed range is saved.
- Cursor: Waveform data in the cursor range is saved. You can select this option when cursors are displayed.
- User: Waveform data in the range specified manually are saved.

Unit

Select the save range unit from the following.

Points: Set the range of data to save using points. Specify the range of data to save by specifying the start point and the end point or the number of data points to save from the start point. The maximum number of data points that you can specify is the number of data points between the start point and end point.

Absolute Time: Set the range of data to save using date and time. Specify the start date/time and the end date/time or the length of time from the start time. The maximum length of time that you can specify is the time from the start time to the end time.

Relative Time: Set the range of data to save by specifying the relative time from the start of measurement. Specify the start time and the end time or the length of time from the start time. The maximum length of time that you can specify is the time from the start time to the end time.

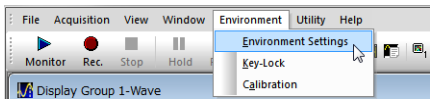
Save Range Information

Save range information is displayed. If Save Range is set to User, you can set the range to save.

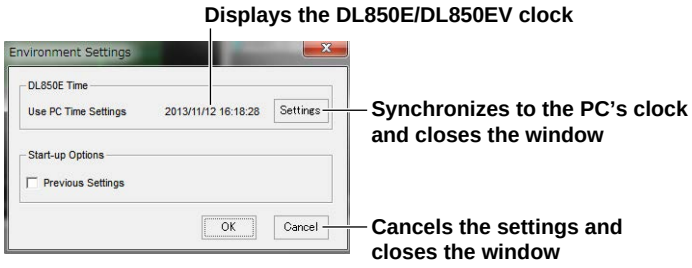
9.1 Synchronizing the Clock with Your PC

You can synchronize the clock of the DL850E/DL850EV to your PC's clock.

1. On the **Environment** menu, click **Environment Settings**.



2. Click **Settings**. The DL850E/DL850EV clock is synchronized to the PC's clock.
3. Click **OK**.



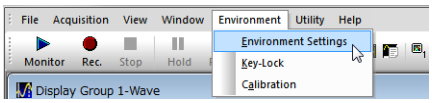
Note

The date/time on the DL850E/DL850EV is set to the date/time in Japan by factory default.

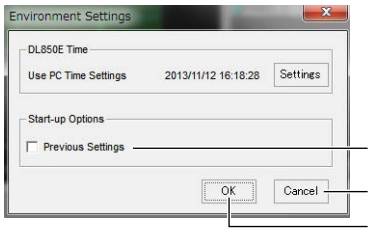
9.2 Setting the Software Start-up Options

Set the how this software operates when it is started.

1. On the **Environment** menu, click **Environment Settings**.



Set the start-up options.



Set the start-up options.

Cancels the settings and closes the window

Applies the settings and closes the window

Start-up Options

The software starts with the settings that were used when the software was closed the last time. This option is useful if you want to make measurements using the same system configuration as the last time.

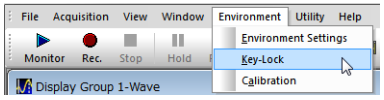
Note

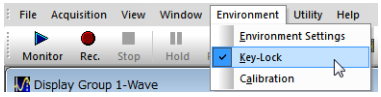
If you start the software with the Previous Settings check box selected and the system configuration and the settings of the setup file are different, a message and corrective action will appear. The message and corrective action vary depending on the current condition. For details, see section 2.4.

9.3 Locking the Keys on the DL850E/DL850EV

The panel keys of the connected DL850E/DL850EV can be locked.

1. On the **Environment** menu, click **Key-Lock**.
   If the keys are locked, a check mark appears in front of Key-Lock, and the KEY PROTECT key on the DL850E/DL850EV is illuminated.
2. To clear the key-lock, click **Key-Lock** on the Environment menu again.
   You can also use the KEY PROTECT key on the DL850E/DL850EV to clear the key-lock.

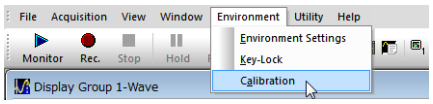




9.4 Calibrating the DL850E/DL850EV

You can calibrate the connected DL850E/DL850EV or set the auto calibration.

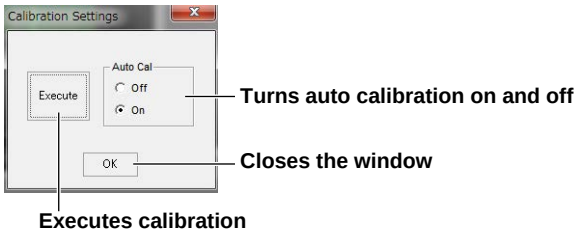
1. On the **Environment** menu, click **Calibration**.



To execute calibration, click **Execute**.

To set the auto calibration, select **ON** or **OFF**.

If ON is selected, calibration is executed automatically if measurement is started a certain time after starting the DL850E/DL850EV.



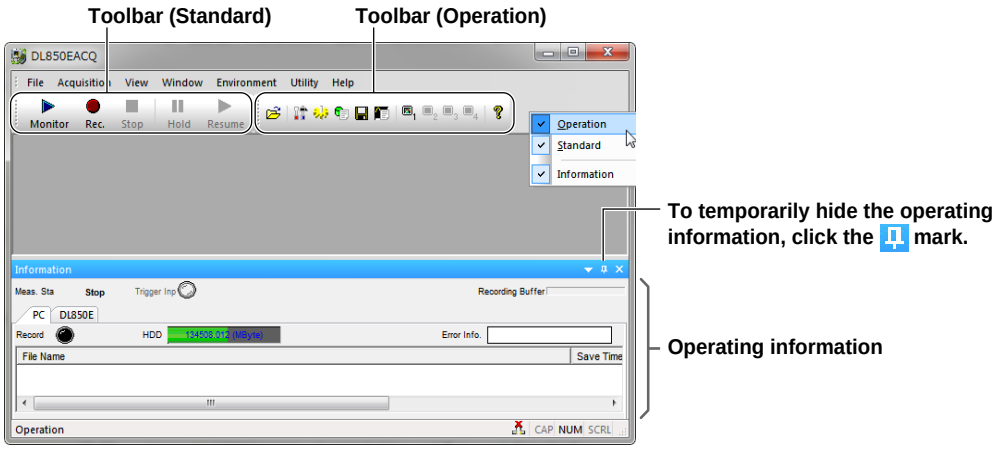
Note

You cannot execute calibration while the DL850E/DL850EV is measuring.

9.5 Displaying the Operating Status and Showing, Hiding, and Undocking the Toolbars

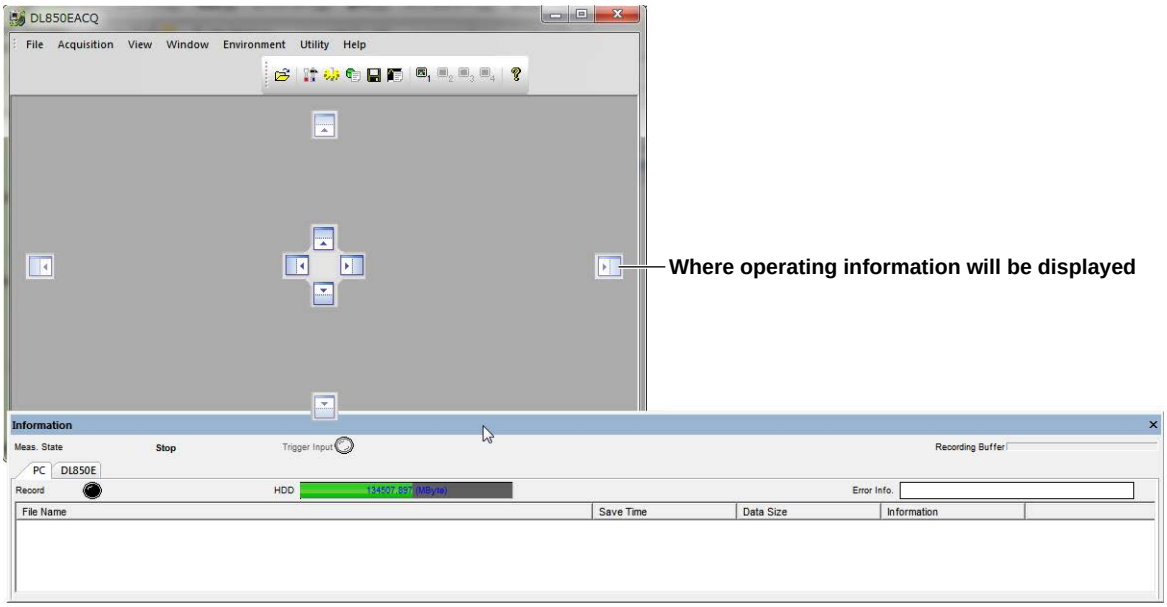
You can show and hide various buttons, the status bar, and the operating status. You can also undock the toolbars (with various buttons) and the operating status display area from the window.

1. Right-click a toolbar (Standard or Operation) or the operating status display area. A menu for showing and hiding these items appears. Click the item you want to show to place a check mark. To hide the item, click it again to clear the check mark.



Undocking from the DL850EACQ Window

Double-click these items to turn them into separate dialog boxes. To dock them again, drag them to their original positions or double-click them. The toolbar can be positioned at the top (original position), left, or right. The operating status display area can be positioned at the top, bottom, left, or right.

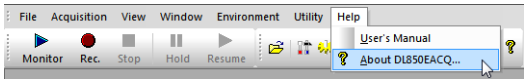


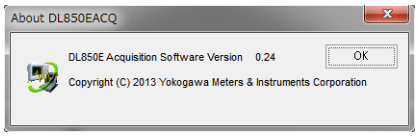
Note

- Dialog boxes that have been separated from the window can be changed in shape by dragging.
- The operating status display area can be docked only when is active.

9.6 Displaying the Software Version

1. Click the button, or click **About DL850EACQ...** on the **Help** menu.
   DL850E/DL850EV Acquisition Software version information will appear.





2. Click **OK**.
   DL850E/DL850EV Acquisition Software version information will close.

10.1 Troubleshooting

Problem	Probable Cause and Corrective Action
Unable to connect to the DL850E/ DL850EV.	• The USB or Ethernet cable may not be connected properly. Check the cable connection. • If connected over an Ethernet network, the specified IP address may be different from the actual IP address of the DL850E/DL850EV. Check the IP address assigned to the DL850E/DL850EV on the DL850E/DL850EV display. • Connection cannot be established if the DL850E/DL850EV is turned off. Turn on DL850E/DL850EV power switch.
Some waveforms are not displayed.	If there are many display channels, a portion of the channels may not be displayed. A message indicates which channels are not displayed. To display those channels, lower the CPU load by decreasing the number of displayed groups, decreasing the number of displayed channels, lowering the sample rate, and so on.

10.2 Messages

DL850E/DL850EV Messages

Error Code	Message	Explanation and Corrective Action
57	Automatic strain balancing is in progress. Wait for a moment.	—
58	Automatic strain balancing is complete.	—
59	Calibrating. Wait for a moment.	—
60	Calibration is complete.	—
504	Out of disk space. Delete unnecessary files or move files to your PC to free up space.	Delete unnecessary files from the recording destination hard disk (PC or DL850E/DL850EV).
656	Calibration failure. Check that CH[n] of Slot[n] is available.	Check the input signal of the specified channel.
661	Strain balancing failed. Check that CH[n] of Slot[n] is available.	Check whether the specified channel is connected.
697	Range over occurred during shunt calibration. Check the input voltage or range settings.	Increase the vertical scale and execute the calibration again.
906	Fan stopped. Turn off the power immediately after stopping measurement and recording.	Servicing is required.
904	Buffer overrun occurred. It will take [n] seconds to finish recording the rest of the data. Abort recording now?	The tendency for a buffer overrun to occur increases if the sample rate is fast or the number of channels is large. If you abort the recording, the data being recorded will be lost.
905	Buffer overrun occurred on internal HDD. It will take [n] seconds to finish recording the rest of the data.Abort recording now?	The tendency for a buffer overrun to occur increases if the sample rate is fast or the number of channels is large. If you abort the recording, the data being recorded will be lost.
909	HDD is full. Recording to the DL850E will be stopped. Delete unnecessary files or move files to your PC to free up space.	Delete unnecessary files from the recording destination hard disk (PC or DL850E/DL850EV).
941	Probe power is overloaded status. Pull the probe and check the consumption current.	The maximum output current from the DL850E/DL850EV probe power supply (/P4 option) is 1300 mA. Check the current consumption on the connected probe.

Software Messages

Message	Explanation and Corrective Action
Cannot find units.	Appears if you start the DL850E/DL850EV by specifying Previous Settings for the start-up option and the DL850E/DL850EV cannot be found. Check that: • The DL850E/DL850EV is connected. • The DL850E/DL850EV is turned ON.
The system configuration is different.	Appears if you start the DL850E/DL850EV by specifying Previous Settings for the start-up option and the system configuration of the DL850E/DL850EV is different from the previous configuration.
Get settings from the DL850E.	The settings will be loaded from the DL850E/DL850EV.
Stop measurement ?	Appears if the exit option in the environment settings is set to End ACQ and you close the software while the connected DL850E/DL850EV is measuring.
The connected DL850E is being remotely controlled by another application. Close the other application and connect to the DL850E again.	This message appears if another PC is connected to the detected DL850E/DL850EV. Disconnect the other PC from the DL850E/DL850EV first and then connect to the DL850E/DL850EV. This message also appears if you try to connect to the DL850E/DL850EV immediately after the software is terminated by force for some reason. Wait for a few seconds and connect again.
No display data.	Appears if there are no channels to be displayed in the current value display. Select a display channel.
Select the target channel on the sheet.	To carry out P1X Measure or P2X Measure, select the channel to be measured in the Measurement Settings window.
Failed to generate file	Failed to save the data.
Disconnecting the DL850E.	Appears if you search for and connect to an DL850E/DL850EV in the System Configuration window and then close the System Configuration window using the Cancel button. The DL850E/DL850EV will be disconnected.
Failed to load the setup file.	The setup file is corrupt.
Cannot find Xviewer. Select Xviewer.	Unable to find Xviewer (a software provided with this software). Specify the location of the Xviewer application.
Stopping measurement and sending settings to the DL850E.	If the DL850E/DL850EV is measuring, the settings cannot be updated. Stop the measurement and update the DL850E/DL850EV settings using the settings of this software.
Stop recording?	Appears if the exit option in the environment settings is set to End ACQ and you close the software while the connected DL850E/DL850EV is recording.
To execute this operation, stop measurement first.	Not allowed while the DL850E/DL850EV is measuring.
To execute this operation, stop recording first.	Not allowed while the DL850E/DL850EV is recording.
Assign the measurement channels in Connection Settings.	Appears if you start a measurement without assigning channels to measuring groups. Click OK to open the System Configuration window.
Cannot find the selected path.	Appears if the specified path to the recording folder is invalid.
Holding the display	Appears while holding the waveform display.
Disconnected the unit.	Appears when the DL850E/DL850EV is disconnected improperly such as by removing the communication cable or by turning the DL850E/DL850EV off while connected to the DL850E/DL850EV.
Failed to display some channels because of no data in display time.	Appears when channels are assigned to a single display group from different measuring groups and those channels are set to extremely different sample rates and measured data is not available in a channel set to a low sample rate.
Cannot find File Utility. Select File Utility.	Appears when the File Utility is not found. The File Utility is installed as an JS option of Xviewer. Check whether the Xviewer's JS option is installed.
Current Firm Version is not supported, you will not be able to connect.	Appears when the Acquisition Software version is incompatible with the DL850E firmware. Update the Acquisition Software or the DL850E firmware.
Accumulated/Snapshot waveforms will be cleared to resize a waveform area.	Appears when the size of the area that is used to draw the waveform changes. To clear all the accumulated and snapshot waveforms, click OK; otherwise, click Cancel.

Message	Explanation and Corrective Action
Accumulated waveforms are displayed. Clear accumulation to resize the window.	Appears when you change the window size while accumulated or snapshot waveforms are displayed. To change the window size, clear all the accumulated waveforms and snapshot waveforms.
Cannot set marks more than the maximum number of marks(128).	Appears when you set the 129th mark. Delete marks that you no longer need, and set the mark again.
Turn OFF HD Recording before Connecting the DL850E.	—
Turn OFF GO/NO-GO judgment before Connecting the DL850E.	—

11.1 Connection to the DL850E/DL850EV

Item	Specifications
Maximum number of connections	1
Connection type	USB or Ethernet

11.2 Measurement Functions

Item	Specifications
Measurement control	Measurement start and stop
Measuring channels	The same as the number of measuring channels on the DL850E/DL850EV
Measuring mode	Free Run mode
ACQ mode	Normal, Envelope, and Box Average
Clock source	Internal clock
Time axis accuracy	±0.005% (under standard operating conditions)
Sample rate	5 S/s, 10 S/s, 20 S/s, 50 S/s, 100 S/s, 200 S/s, 500 S/s, 1 kS/s, 2 kS/s, 5 kS/s, 10 kS/s, 20 kS/s, 50 kS/s, 100 kS/s, 1 MS/s
Sample interval	1/sample rate

11.3 Recording Function

Item	Specifications
Recording control	Recording start and stop
Recording destination	PC HDD, DL850E HDD, PC+DL850E HDD (the DL850E HDD is an option)
Maximum real-time hard disk recording speed[2]	PC hard disk: 1.6 MS/s (= 100kS/s×16ch) DL850E/DL850EV hard disk: 1.6 MS/s (= 100kS/s×16ch)
Recording time (for Free Run mode)	Until the free space on the hard disk runs out If the file exceeds 2 GB, the file is divided into multiple files that are 2 GB or less in size.
File designation	Folder designation, file name designation, auto naming (date and sequence number), and comments
File order	Sequential and cyclic
File format	YOKOGAWA original binary format (.wdf extension)

11.4 Functions

Display Function

Item	Specifications
Display group assignment	Channel assignment to display groups (up to 4 groups)
Number of display channels	Up to 32 channels/group
Waveform display format	T-Y
Displayed time	Maximum sample interval × 10 to channel record length/maximum sample rate
Current value display	Digital, bar graph, meter, and thermometer
Display scale	OFF (= vertical scale), user-defined scale, and auto scale
Display axis setting	Multi zone, Slide zone, and Edit zone
Graph settings	Line width, alarm level display, current mark, X-axis display format, X-axis scaling, X-axis unit, etc.
Display interpolation	Line, Sine, Pulse, Dot (no interpolation)
Accumulation display	Accumulates T-Y waveforms
Snapshot	The waveform that is currently being displayed can be retained on the screen as a snapshot waveform. Display color setting and snapshot waveform deletion
Display control	Display hold and hold release (sample rate at 100 kS/s or less in Free Run mode)
DL850E/DL850EV operation status monitor	Measurement status, recording status, free disk space, recording buffer status, error information, and recorded file information, etc.

Waveform Analysis Function

Item	Specifications
Cursor	Horizontal cursors and vertical cursors
Past data/history data analysis	View past data/history data using a scroll bar Auto play: Automatically displays past data or history data. Auto play, reverse play, stop, go to oldest data, go to most recent data, and play speed adjustment

File Function

Item	Specifications
Setup file	Load and save Acquisition Software settings
Waveform screen capture file	Screen capture data format: BMP or PNG
Waveform data file	Saves waveform data, output data format: WDF (YOKOGAWA original format)

Other Features

Item	Specifications
Calibration	Auto calibration and manual calibration available
Environment settings	DL850E clock synchronization and start-up options
Key lock	Control the DL850E/DL850EV key lock and release

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