
**User's
Manual**

**DTAP200
DTSX200 Control Visualization
Software Guide**



IM 39J02B45-01E

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Introduction

■ About this Manual

Thank you for purchasing the DTSX200 Control Visualization Software DTAP200.

This document describes the functions, operation and usage precautions of the DTAP200. Read it carefully before using the software to ensure proper use. After reading, save this document in an accessible location for easy reference during software use.

Besides this manual, the table below lists four other manuals related to the DTSX200 Distributed Temperature Sensor. Read these manuals as well.

Manual name	Document No.	Description
DTSX200 Distributed Temperature Sensor Guide	IM39J06B45-01E	This document describes the functions, operation and usage precautions of the DTSX200 Distributed Temperature Sensor.
DTSX200 Communications (Modbus) Guide	IM39J06B45-02E	This manual describes commands for controlling the DTSX200 Distributed Temperature Sensor.
DTAP200 DTSX200 Control Visualization Software LAS 2.0 Data Conversion Guide	IM39J02B45-02E	This document describes the functions, operation and usage precautions of the software for converting and transmitting measurement data of the DTSX200 Distributed Temperature Sensor in LAS format.
DTAP200D DTSX200 Data Conversion Software WITSML1.3.1.1 Guide	IM39J02B45-03E	This document describes the functions, operation and usage precautions of the software for converting and transmitting measurement data of the DTSX200 Distributed Temperature Sensor in WISTML format.

■ Caution

- This document describes the DTSX200 Control Visualization Software R1.02.01. You can check your software version by selecting [Help] from the software menu bar.
- YOKOGAWA reserves the right to make improvements in the manuals and product at any time, without notice or obligation. Moreover, actual screen display in the software may differ somewhat from the screen display contained in this document.
- If you have any questions, or you find mistakes or omissions in the manuals, please contact our sales representative or your local distributor.
- The use and operation of Windows is not described in this document.
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**DTAP200
DTSX200 Control Visualization
Software Guide**

IM 39J02B45-01E 2nd Edition

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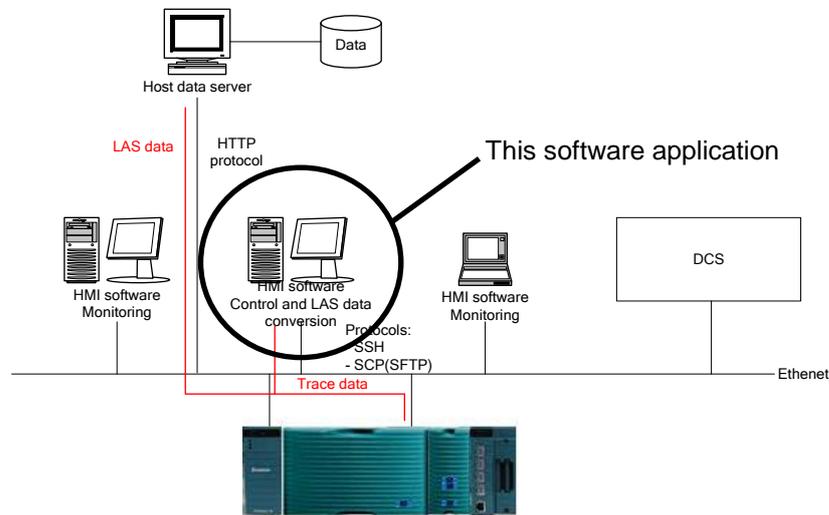
1. Before Using the Software

1.1 Functional Description of the DTSX200 Control Visualization Software

DTAP200 includes two software applications, namely, DTSX200 Control Visualization Software and the DTSX200 Control Visualization Software LAS 2.0 Data Conversion. For information on how to use the DTSX200 Control Visualization Software, read this Guide.

SEE ALSO

For information on how to use DTSX200 Control Visualization Software LAS 2.0 Data Conversion, see the DTAP200 LAS 2.0 Guide (IM39J02B45-02E).



The DTSX200 Control Visualization Software runs on a PC connected to a DTSX200 via Ethernet. It has the four main functions described below.

(1) Control mode

In control mode, you can control temperature measurement by the DTSX200, acquire temperature data files created by the DTSX200 and display the data in charts.

Acquired temperature data files are saved to a storage device connected to a PC.

DTSX200 error and temperature alarm status display are also available.

SEE ALSO

For details, see Chapter 5, "Control Mode."

(2) Monitoring mode

In monitoring mode, all functions of the control mode are available except DTSX200 control functions. In monitoring mode, you can get temperature data files of a DTSX200 module controlled by other DTSX200 Control Visualization Software and display the data in charts.

As in control mode, acquired temperature data files are saved to a storage device connected to a PC. DTSX200 error and temperature alarm status display are also available.

SEE ALSO

For details, see Chapter 6, "Monitoring Mode."

(3) Calibration mode

In calibration mode, you can use wizards to perform the following two types of calibration for the DTSX200:

- detect fiber connection points automatically and enter fiber parameters for each connection point;
- correct for fiber loss

SEE ALSO

For more details, see Chapter 7, "Calibration Mode."

(4) Trace mode

In trace mode, you can load temperature data files, which are saved on a storage device connected to the PC and display the temperature data in a chart in offline state.

SEE ALSO

For more details, see Chapter 8, "Trace Mode."



IMPORTANT

- Up to eight instances of the DTAP200 (this software), DTAP200D and DTAP200 LAS2.0 software applications combined can be run concurrently on a PC.
 - However, running multiple instances of the applications on a PC may slow down response time significantly due to heavy processing load so the use of a powerful PC is recommended.
 - Up to four users of the DTAP200 (this software), DTAP200D and DTAP200 LAS2.0 software applications combined can be connected to the DTS concurrently.
-

- List of functions in each mode

Function	Control Mode		Monitoring Mode		Calibration Mode		Trace Mode
	Online	Offline	Online	Offline	Online	Offline	Offline
Setting measurement parameters	O	Δ	Δ	Δ	O	Δ	X
Measurement control	O	X	X	X	O	X	X
Saving measurement result	O	X	O	X	O	X	X
Measurement result display	O	O	O	O	O	O	O
Status display	O	O	O	O	O	O	O
Self-test execution	O	X	X	X	O	X	X

O: Enabled;

Δ: Configurable but edited settings are not updated to DTSX200;

X: Disabled

1.2 System Requirements

- **Operating system (OS)**

The software runs on the following operating systems:

- Windows7 Home Premium SP1 (x86 / x64)
- Windows7 Ultimate SP1 (x86 / x64)
- Windows7 Professional SP1 (x86 / x64)
- Windows7 Enterprise SP1 (x86 / x64)

(.NET Framework 4.0 is required)

The software is not guaranteed to run properly on other operating systems not listed above.

- **Personal computer (PC)**

The PC must be installed with any of the above operating systems, as well as a CPU and memory meeting the following requirements:

Dual-core 32-bit processor 2 GHz or better

2 GB or more memory

- **Hard disk**

2 GB or more free space

- **Optical disk drive**

An optical disk drive compatible with the operating system and capable of reading CD-ROMs is required for software installation.

- **Mouse, keyboard and other input devices**

Input devices supported by the operating system

- **Display**

A video card recommended for use with the operating system and display device supporting 1024X768 dpi resolution or higher and 65536 colors or more, and supported by the operating system

- **Printer**

Printer and printer driver compatible with the operating system

- **Ethernet adaptor**

Ethernet adaptor (100BASE-TX or 10BASE-T) supported by the operating system

- **Baud rate (throughput)**

Baud rate between PC and DTSX200: 500 kbps or higher

Module operation may be unstable if baud rate (throughput) is below 500 kbps.

TIP

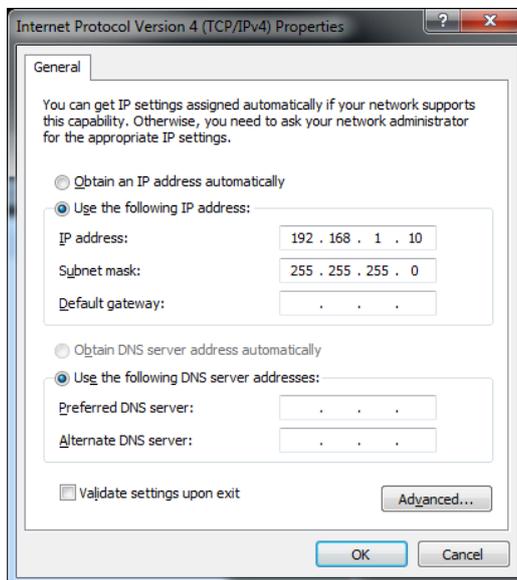
- To install the software in Windows7, you must log in as a user with Administrator authority.

1.3 Installation Procedure

SEE ALSO

Read the DTAP200 installation manual (IM39J02B45-04E) bundled with the software.

1.4 Network Setup



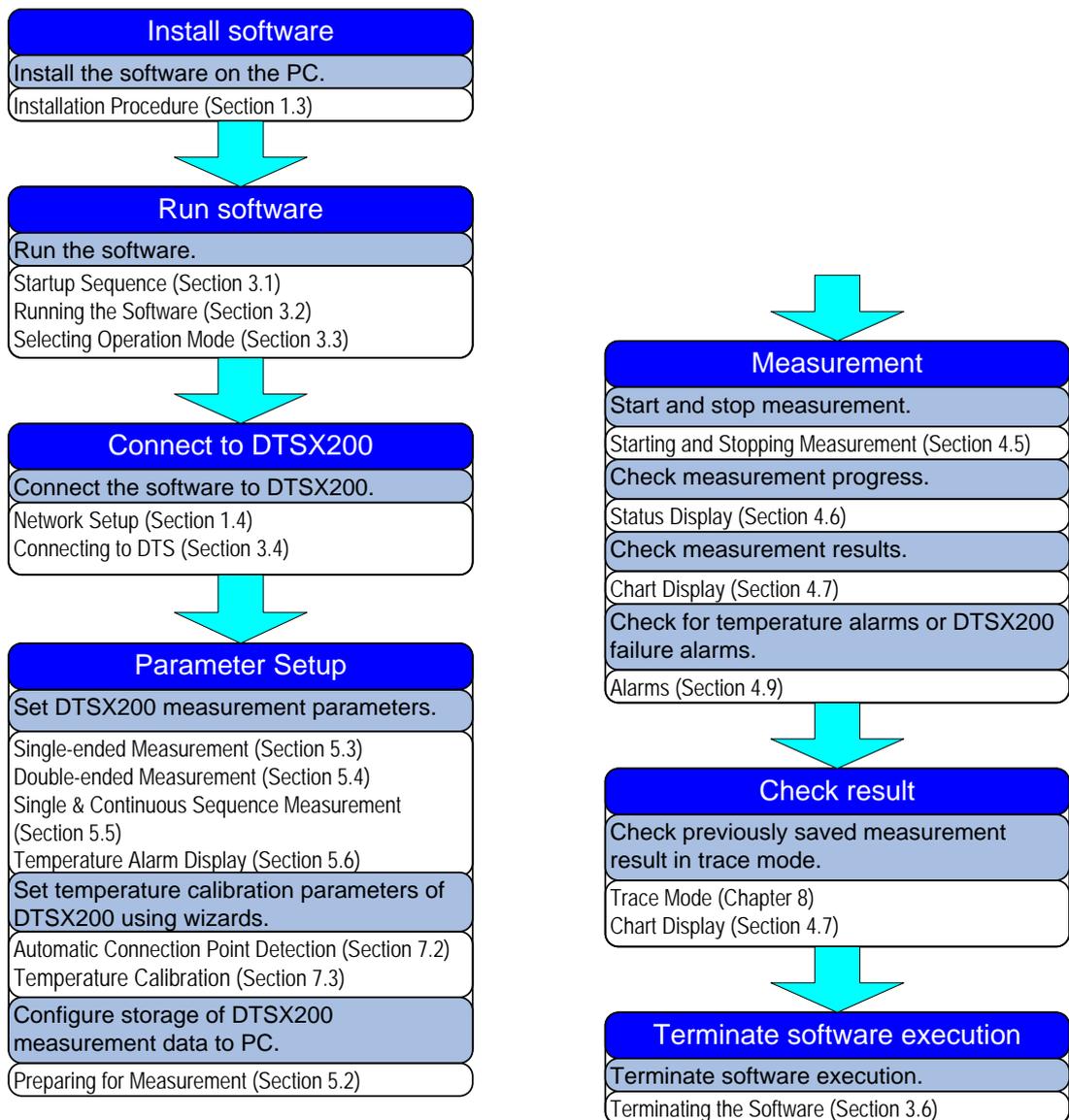
Set the IP address of the PC to a fixed IP address on the same segment as the IP address of the DTSX200.

As shown in the figure above, select the Use the following IP address option, and enter the IP address and subnet mask. For details on the network settings, consult your system administrator.

2. Using the Software

2.1 Operation Flowchart

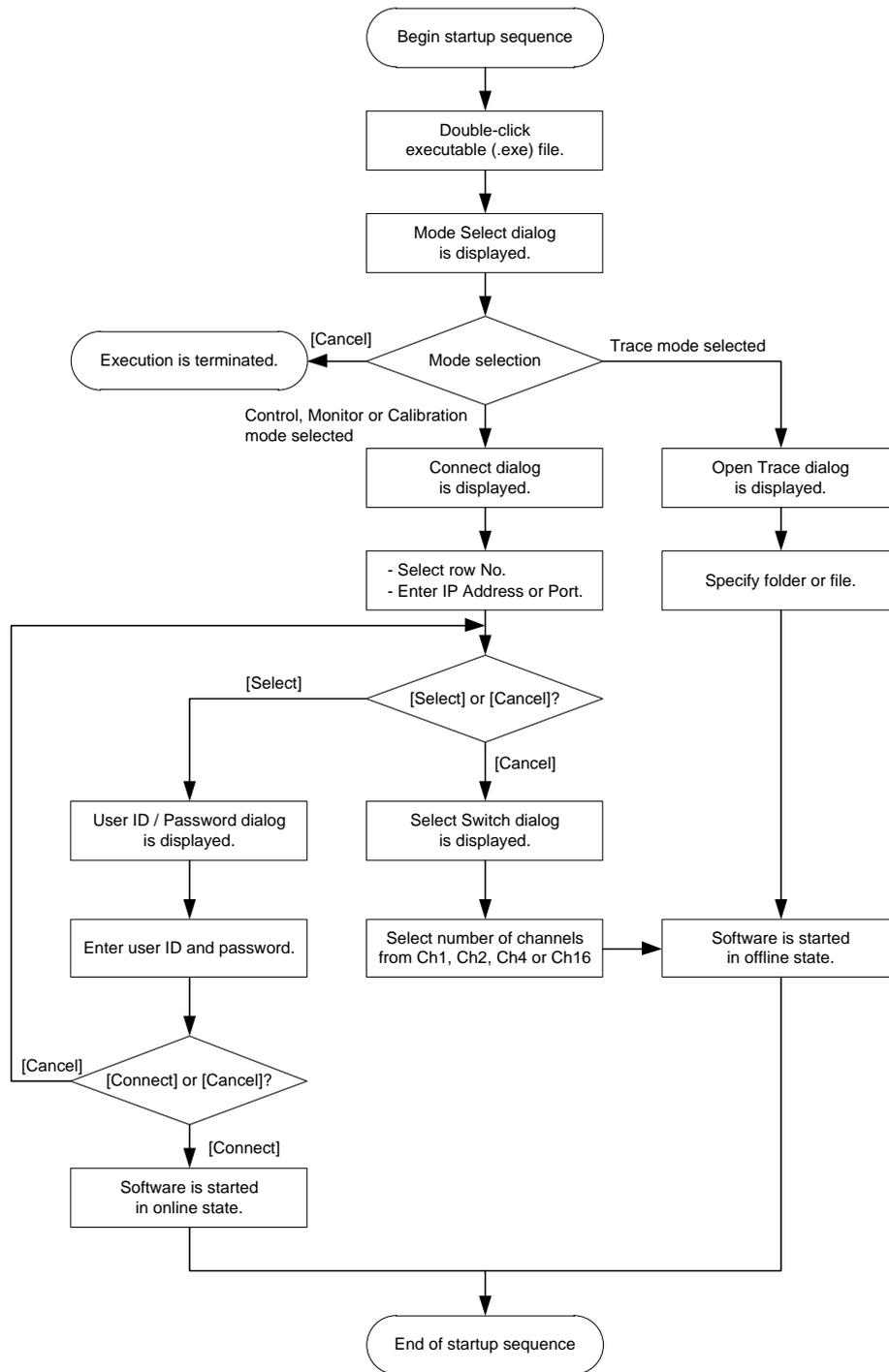
The operation flowchart below shows the overall operation flow when using the software for the first time. For details on individual items, see the respective chapters or sections indicated in the flowchart.



3. Running and Terminating the Software

3.1 Startup Sequence

The flowchart below gives an overview of the startup sequence for the DTSX200 Control Visualization Software. For details on individual items, see the respective sections.



3.2 Running the Software

This section describes how to run the DTSX200 Control Visualization Software.

- **Running the software from the Start menu**

In Microsoft Windows running on a PC, select Start>All Programs> YOKOGAWA DTSX200>DTSX200 Control Visualization Software.

- **Running the software from its desktop icon**

You can also run the software by double-clicking the “DTSX200 Control Visualization Software.exe” icon on the desktop.



3.3 Selecting Operation Mode

At startup, the DTSX200 Control Visualization Software first displays the Select Mode dialog for selecting the operation mode.

- **Selecting operation mode**

Select Control, Monitor, Calibration or Trace as the operation mode, and click [OK]. This confirms the operation mode selection.

If you have selected Control, Monitor or Calibration mode, proceed to connect with DTSX200 (see Section 3.4).

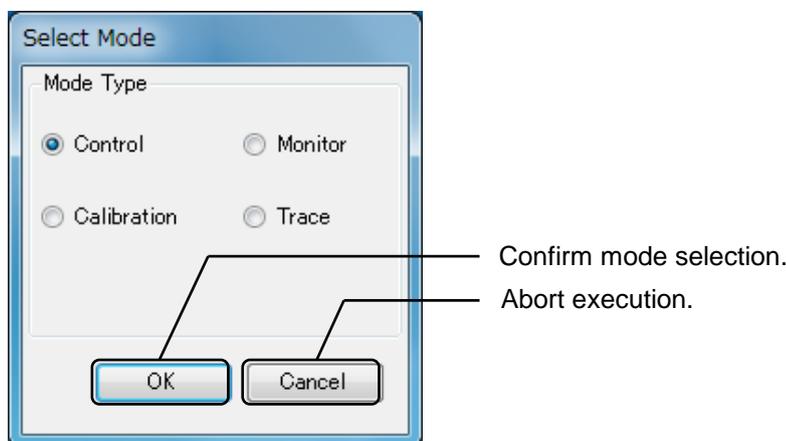
If you have selected Trace mode, proceed to specify a trace folder (or trace file) (see Chapter 8).

SEE ALSO

For details on individual operation modes, see Chapters 5 to 8.

- **Cancel**

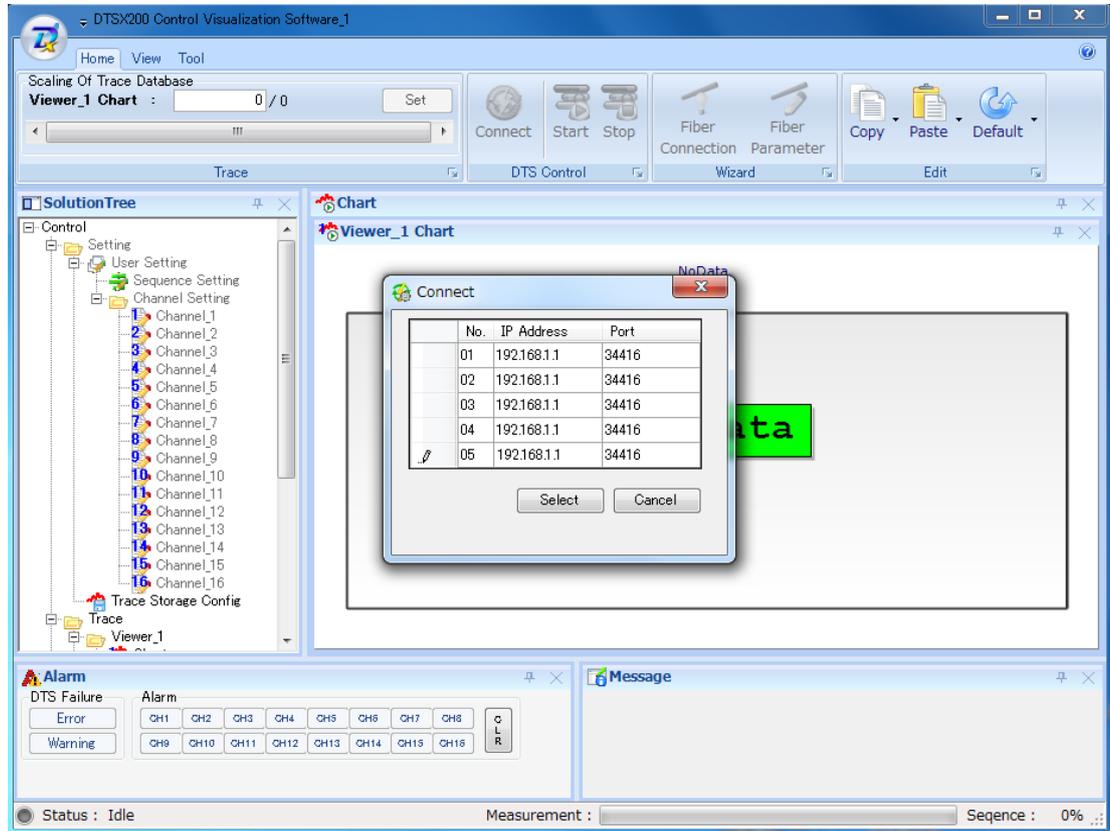
Clicking [Cancel] aborts the execution of the DTSX200 Control Visualization Software.



3.4 Connecting to DTSX200

If you have selected the control, monitor or calibration operation mode, the DTSX200 Control Visualization Software starts up in the selected operation mode and displays the Connect dialog.

At this point, operations of the DTSX200 Control Visualization Software are still disabled. First, you need to define settings for connection to the DTSX200.

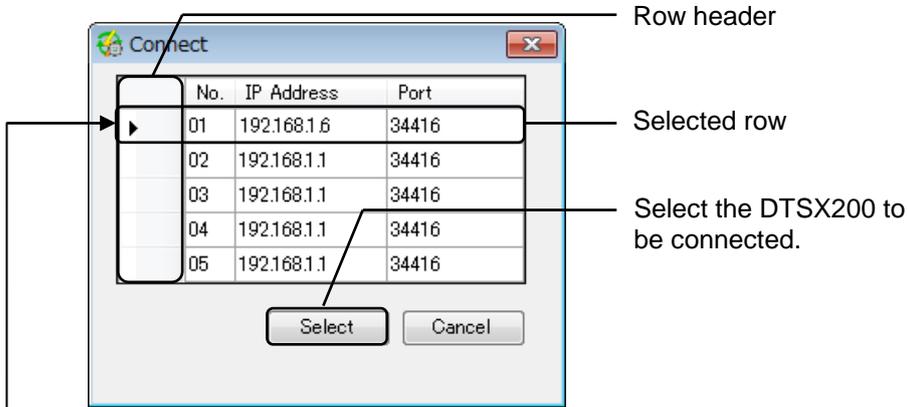


IMPORTANT

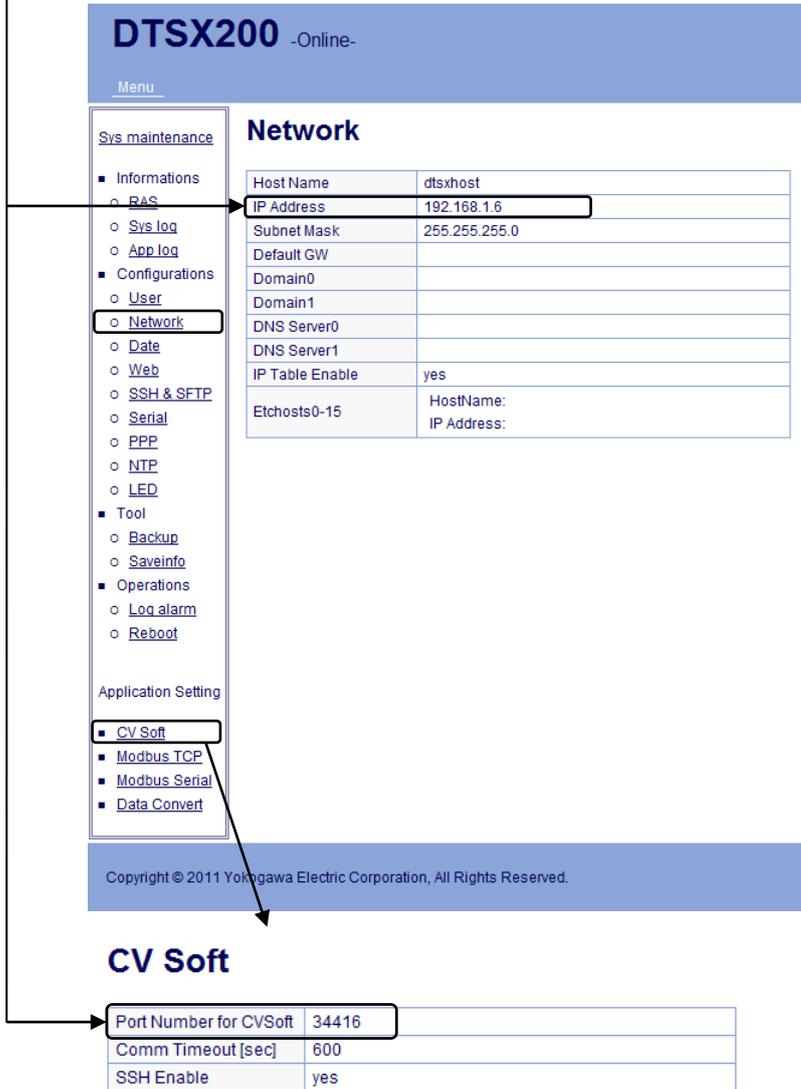
- Only users with read and write authority are allowed to connect to the DTSX200.
- We recommend using the latest version for the DTAP200 software, as well as the firmware on the DTSX200 to be connected, as there may be functional limitations otherwise.

● Define settings for connection to DTSX200

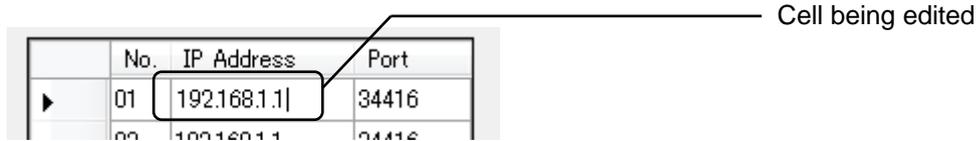
- 1. On the Connect dialog, select the row with network setting (IP address) and CV Soft setting (port number) matching the DTSX200 to be connected by clicking on its row header. An arrow (▶) mark is displayed before the selected row.



Example: DTSX200 system configuration



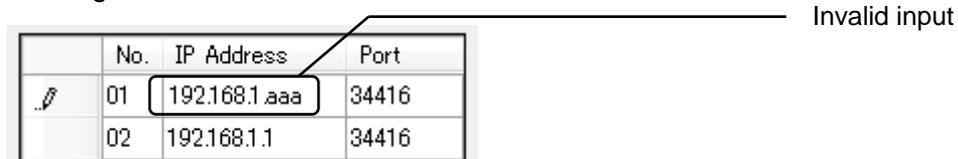
- 2. If none of the displayed rows matches the IP address and the port number of the destination DTSX200, edit a cell value to the required value by first clicking on the cell to enable it.



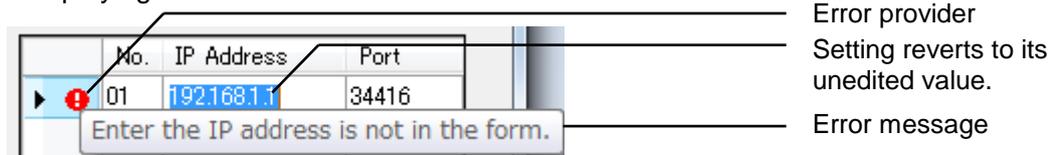
TIP

- Cell numbers displayed in the [No.] column cannot be edited. Only values in the IP Address and Port columns can be edited.
- The software performs input validation when you move the focus to another cell or another control after editing a cell value. If an invalid edited value is detected, the edited value reverts to its unedited value and an error provider control is displayed in the row header area. To see the error message, move the mouse cursor over the error provider.

Editing a cell

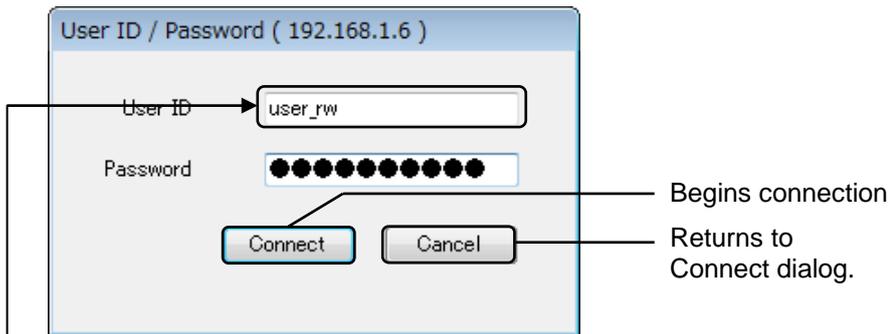


Displaying an error

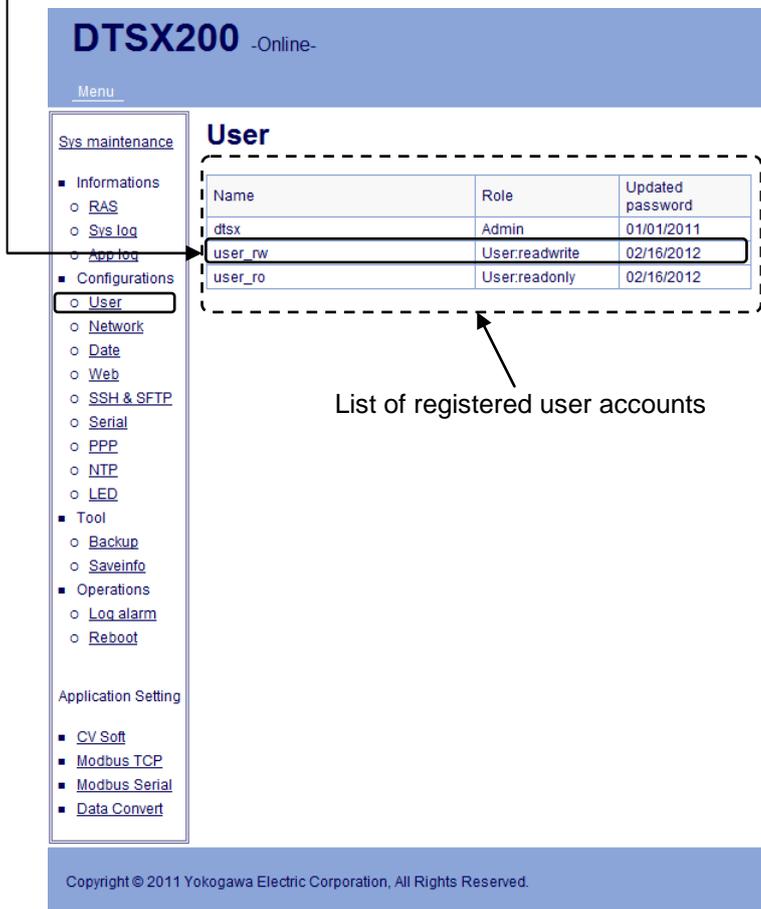


- IP address must be entered in IP address (IPv4) format.
- Port number must be an integer from 0 to 65535.

3. Click [Select]. The UserID/Password dialog is displayed.
4. Enter the user ID and password of a user having read and write authority.



Example: DTSX200 system configuration



TIP

- The [Connect] button is enabled when a user ID is entered.
- Enter the user ID and password of a user account registered in the DTSX200.

SEE ALSO

For details on how to register a user account, see the DTSX200 Guide (IM39J06B45-01E).

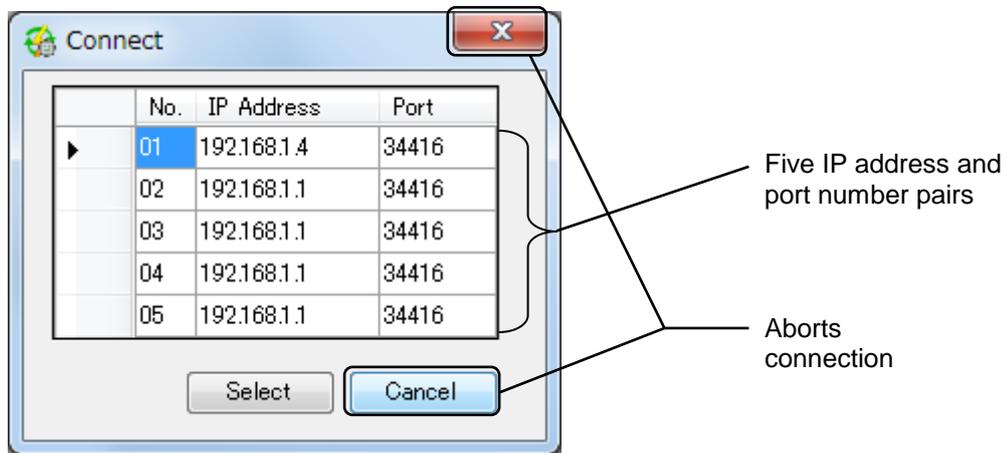
- 5. Clicking [Connect] initiates connection to DTSX200. Clicking [Cancel] returns to the Connect dialog.

TIP

- When you click [Connect] on the UserID/Password dialog, edited settings on the Connect dialog are saved and will be displayed in the Connect dialog when the software is next executed. Up to five IP address and port number pairs can be saved. Entered values are not saved if you click [Cancel].
- Values entered in the UserID/Password dialog are not saved and must be re-entered each time.

- **Canceling connection to DTSX200**

You can abort a connection by clicking the [Cancel] button in the Connect dialog or the [X] button at the top right corner of the Connect dialog. Doing so runs the software in offline state.

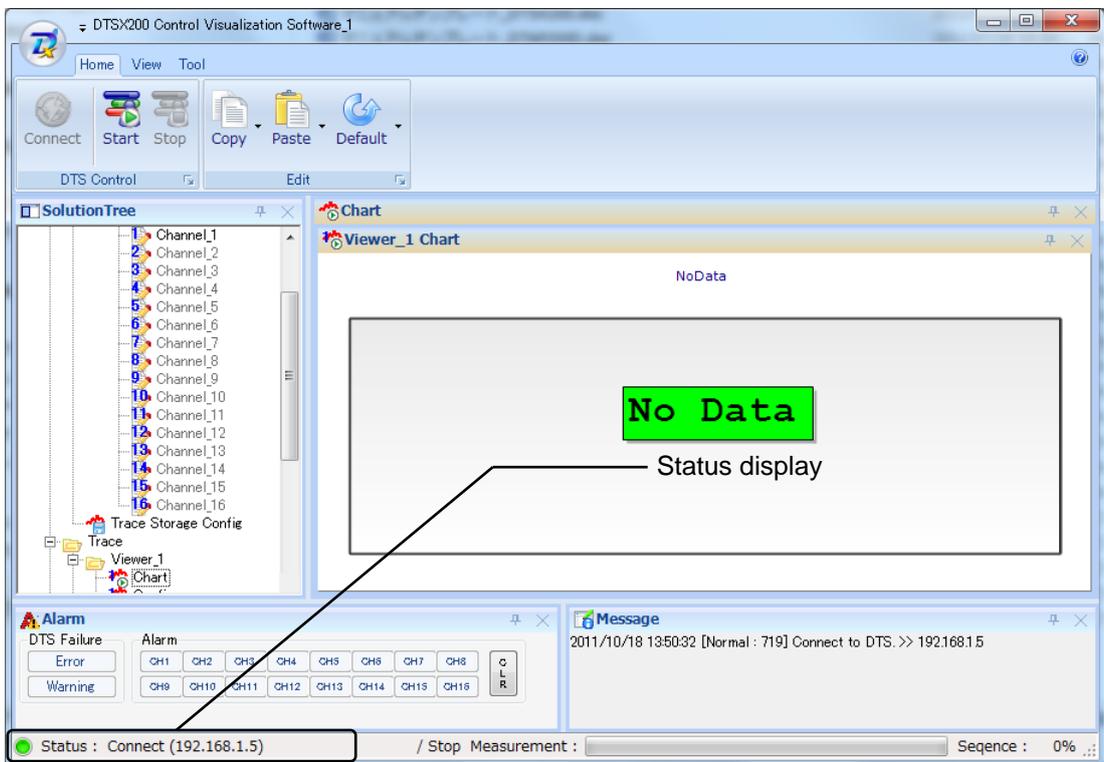


3.5 Online and Offline States

In online state when the software is connected to the DTSX200, you can monitor and control measurement by the DTSX200, as well as perform temperature calibration, etc. On the other hand, in offline state where the software is not connected to the DTSX200, you can redisplay previously acquired measurement data and recalculate temperature data (in trace mode), as well as edit and save settings.

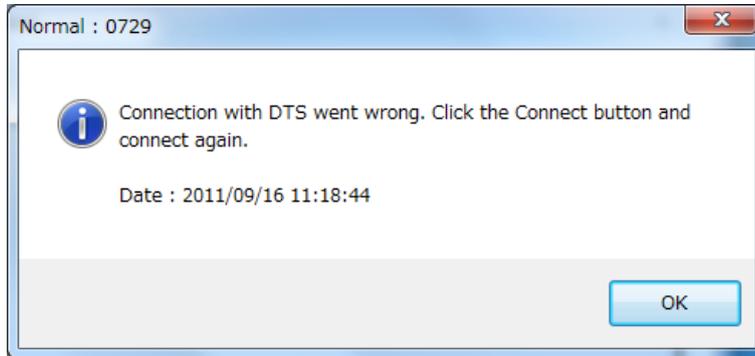
- **Online state**

To control and monitor measurement by the DTSX200, as well as perform temperature calibration, run the software in online state. To do so, click [Connect] in the UserID/Password dialog. Connection to the DTSX200 begins and the DTSX200 Control Visualization Software is activated. The status display changes from “Idle” to “Connecting...” and when connection is successful, to “Connect (IP address of DTSX200).”



TIP

- If connection is unsuccessful, the status display changes to “Retry connection” and the software retries to connect until connection is successful. If the IP address, user ID or password is invalid or the number of attempts exceeds the maximum limit, however, the following error message dialog is displayed and the status display changes to “Idle.”



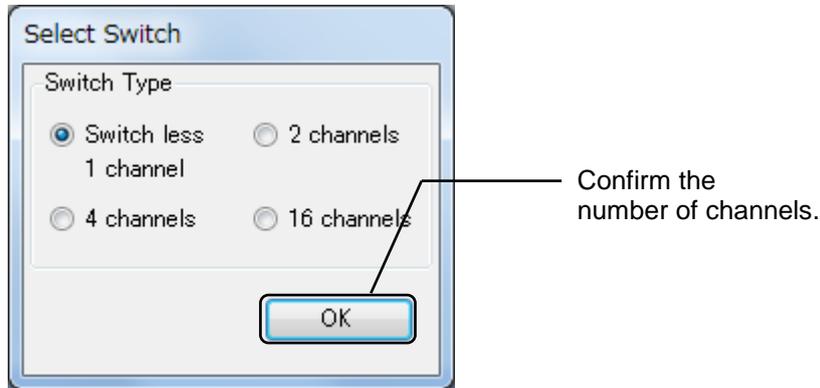
The [Connect] button of the main window is enabled at this time. Click [OK] on the error message dialog, and then click the [Connect] button to redisplay the Connect dialog. Re-enter a valid user ID and a password to connect to the DTSX200.



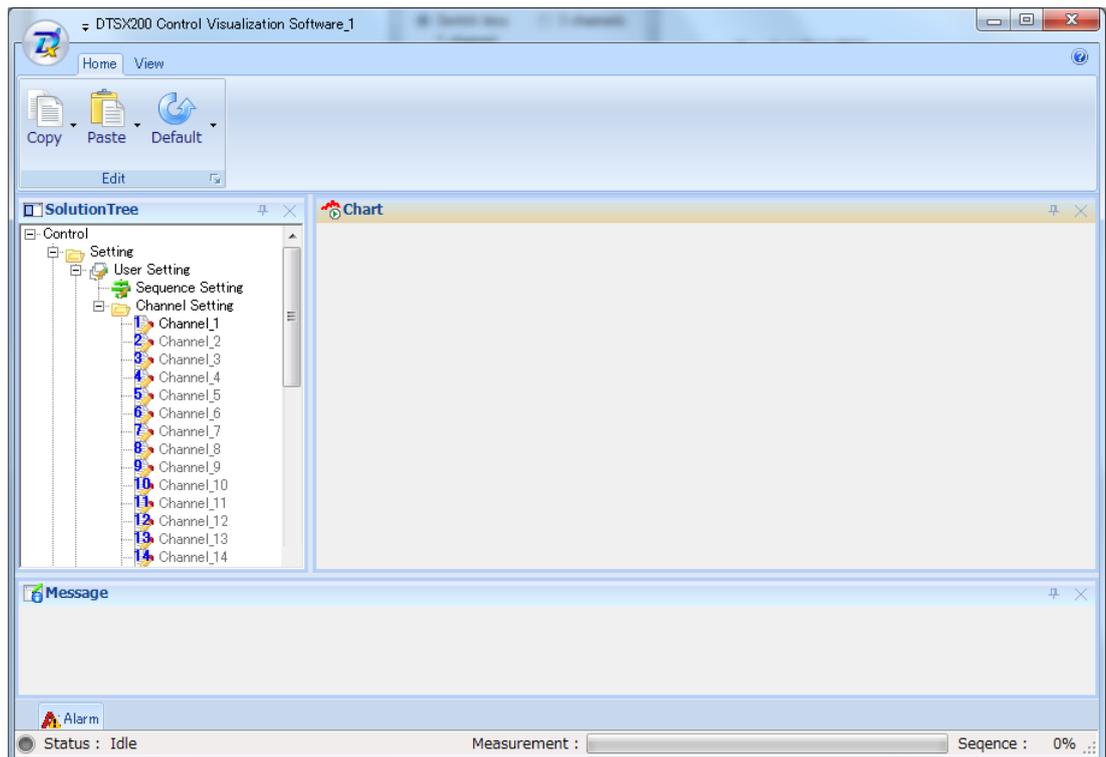
- If connection is successful, the number of channels displayed under Channel Setting automatically changes to match the number of channels of the optical switch.
- If connection is successful, the current setting values of the DTSX200 are retrieved and displayed under Sequence Setting and Channel Setting.

● **Offline state**

Selecting Control, Monitor or Calibration operation mode but not connecting to DTSX200 runs the software in offline state where only editing of setting values is allowed. To run in offline state, click [Cancel] in the Connect dialog. Without connecting to the DTSX200, the number of channels for the optical switch cannot be determined automatically and thus must be specified manually. When Select Switch dialog is displayed, select either switchless , 2 channels, 4 channels or 16 channels for the Switch Type.



Click [OK] on the Select Switch dialog window. The switch type (number of channels) is confirmed and the DTSX200 Control Visualization Software is activated. The status display, however, remains as "Idle."



TIP

- The number of channels displayed on Channel Setting changes automatically to match the number of channels selected for optical switch on the Select Switch dialog.
- Sequence Setting and Channel Setting display the last confirmed edited settings.
- If Trace operation mode is selected, the software always runs in offline state. The software startup sequence in Trace mode differs from the other operation modes. For details on Trace mode, see Chapter 8, "Trace Mode."

3.6 Terminating the Software

This section describes how to terminate the execution of the DTSX200 Control Visualization Software.

- **Terminating the software from the main window menu**

1. Click the icon at the top left of the main window. A menu is displayed.
2. Select [Exit] from the menu.



- **Terminating the software using the [X] button of the main window**

You can also terminate software execution by clicking the [X] button at the top right corner of the main window.



4. Basic Software Operations

This chapter describes the windows, dialogs and basic operations of the software.

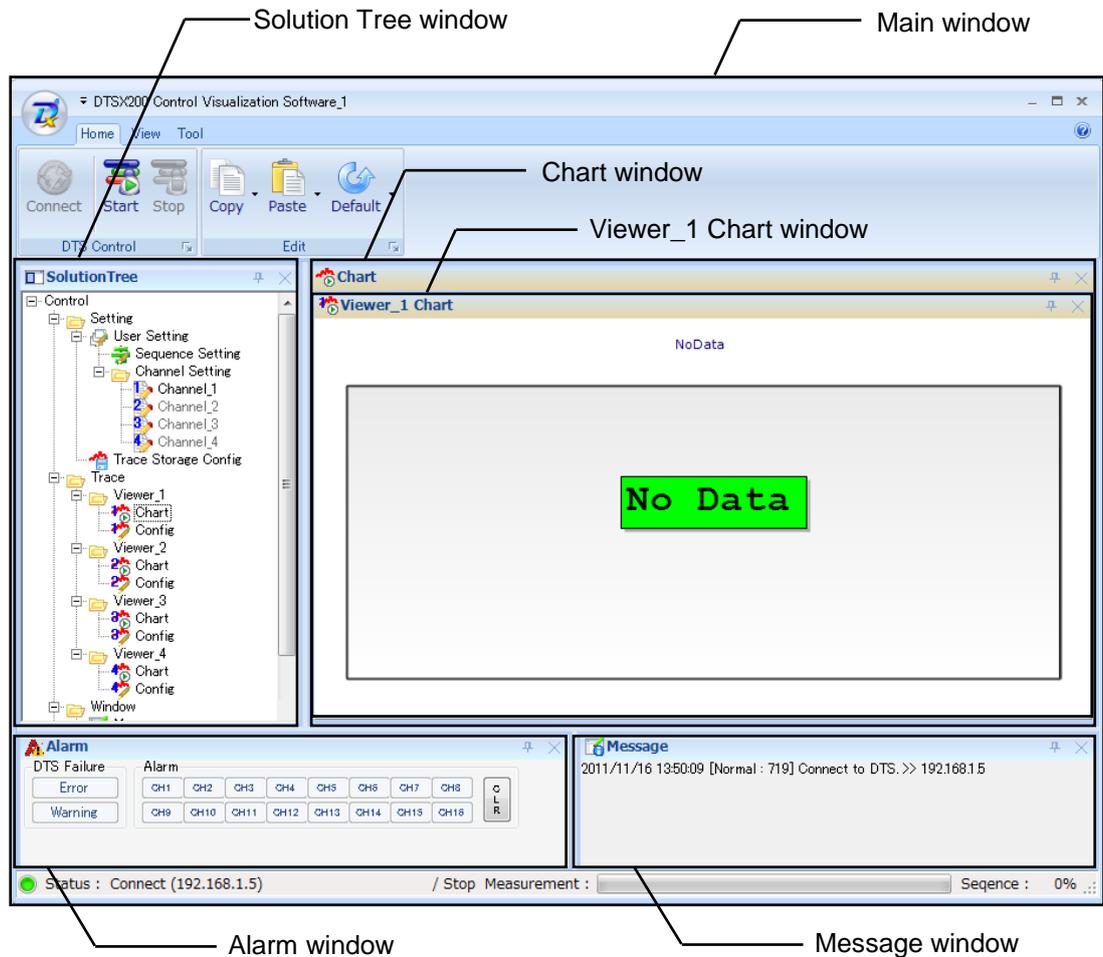
This document distinguishes between “windows”, which can be docked to the main window or Chart window, and “dialogs”, which are displayed as pop-ups of windows.

4.1 Window Components and Functions

When the software is first executed, the main window, Solution Tree window, Chart window, Viewer_1 Chart window, Alarm window and Message window are displayed. For subsequent executions, windows that were previously displayed when software execution was last terminated are restored. Previously displayed Viewer_1-4 Chart windows, however, are not restored. Only the Viewer_1 Chart window is always displayed at software startup.

TIP

- Viewer_1-4 Chart windows are chart display windows displayed in the Chart window.



4.1.1 List of Windows and Dialogs

The tables below list the windows and dialog windows of the software. Dialogs for loading and saving are, however, omitted.

Window Name	Description	For Details, See:
Main	Base window	Subsection 4.1.2, Main Window
Solution Tree	Displays solution tree	Subsection 4.1.3, Solution Tree window
Chart	Base window for displaying Viewer_1-4 Chart windows	Section 4.7, Chart Display
Message	Displays software messages	Section 4.8, Messages
Alarm	Reports DTSX200 errors and warnings	Section 4.9, Alarms
Viewer_1-4 Chart	Displays measurement data in a chart	Section 4.7, Chart Display

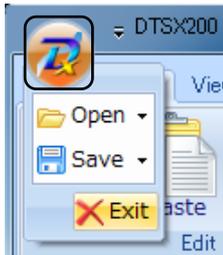
Dialog name	Description	For details, see:
Sequence setting	Measurement sequence settings	Chapter 5, Control Mode
Channel_1-16	Channel settings	
Trace Storage Config	Settings for trace data storage	
Viewer_1-4 Config	Configures display of Viewer_1-4 Chart windows	Section 4.7, Chart Display
Fiber Connection Calibration Wizard	Fiber connection calibration wizard	Section 7.2, Automatic Connection Point Detection
Fiber Connection Calibration	Fiber connection calibration	
Fiber Parameter Calibration Wizard	Fiber parameter calibration wizard	Section 7.3, Temperature Calibration
Fiber Parameter Calibration	Fiber parameter calibration	
CSV Save Config	Conversion to CSV file	Section 8.3, Saving to CSV File
Self Test	DTSX200 self test execution	Section 5.8, Self-test

4.1.2 Main Window

The main window is the base window for all other windows, which can be dragged and dropped onto the main window. Viewer_1 to 4 Config windows, however, are based on the Chart window and thus cannot be dragged and dropped directly onto the main window.

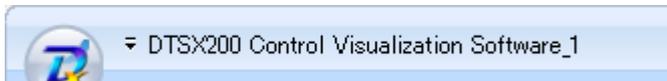
- **Start Menu button**

The Start Menu button is displayed at the top left corner of the main window. Clicking the Start Menu button displays the Start menu for selection of the Open, Save and Exit operations.



- **Title bar**

The title bar is displayed at the top of the main window. The title bar displays the application name as “DTSX200 Control Visualization Software_n” where the suffix n is the application launch ID, which is assigned serially from 1 to 8 each time a DTSX200 software application is run. Up to eight DTSX200 applications can run concurrently on one PC.



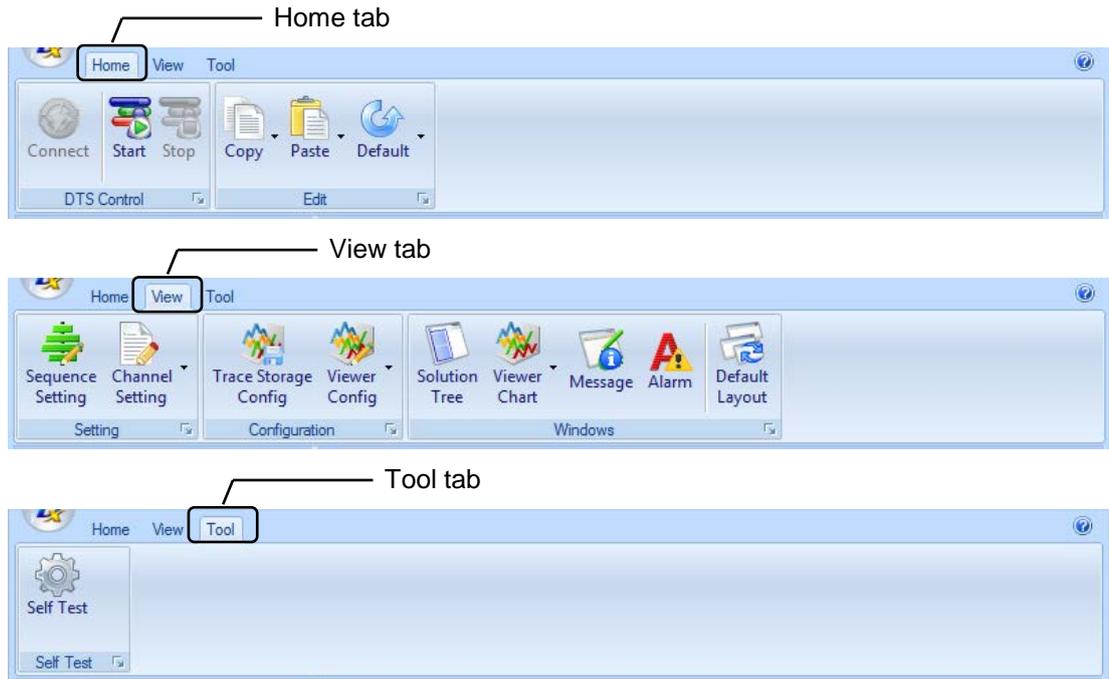
TIP

- Besides this software, other DTSX200 applications include the “DTSX200 Data Control Visualization Software LAS 2.0 Data Conversion” and the “DTSX200 Data Conversion Software WITSML 1.3.1.1”.

- **Menu**

A menu is displayed at the top of the main window. The menu displays a list of buttons for operating the application. You can switch between menus by clicking one of the three tabs displayed above the menu.

Menu (Tab)	Description
Home	Lists buttons for the main functions of the current mode, DTSX200 control functions and settings edit functions.
View	Lists buttons for displaying windows and dialogs.
Tool	Displays a button for displaying the Self Test dialog for DTSX200 self-test execution.



The table below lists the group boxes and buttons for each tab.

Menu item (Tab, group box or button)	Description
Home	Tab for main functions of each mode, DTSX200 control functions and settings edit functions
DTS Control	Group box for DTSX200 control functions
Connect	Button for displaying the Connect dialog
Start	Button for starting measurement
Stop	Button for stopping measurement
Wizard	Group box for main functions of calibration mode
Fiber Connection	Button for running the Fiber Connection Calibration Wizard
Fiber Parameter	Button for running the Fiber Parameter Calibration Wizard
Trace	Group box for main functions of trace mode
Scaling Of Trace Database (*1)	Group box for trace data selection functions
Edit	Group box for settings edit functions
Copy (*2)	Drop-down button that displays a menu for copying various settings
Paste (*2)	Drop-down button that displays a menu for pasting various settings
Default (*2)	Drop-down button that displays a menu for defaulting various settings
View	Tab for window and dialog display functions
Setting	Group box for DTSX200 settings
Sequence setting	Button for displaying Sequence Setting dialog
Channel Setting (*3)	Drop-down button that displays a menu for displaying Channel_1-16 dialogs
Configuration	Group box for application configuration
CSV Save Config	Button for displaying the CSV Save Config dialog
Trace Storage Config	Button for displaying the Trace Storage Config dialog
Viewer Config (*4)	Drop-down button that displays a menu for displaying Viewer_1-4 Config dialogs
Windows	Group box for window display and manipulation
Solution Tree	Button for displaying and giving focus to the Solution Tree window
Viewer Chart (*5)	Drop-down button that displays a menu for displaying and giving focus to the Chart window and each Viewer_1-4 Chart window
Message	Button for displaying and giving focus to the Message window
Alarm	Button for displaying and giving focus to the Alarm window

	Default Layout	Button for initializing the display positions of windows
Tool		Tab for temperature measurement test functions
	Self Test	Group box for DTSX200 self-test function
	Self Test	Button for displaying the Self Test dialog

- *1: Scaling Of Trace Database group box contains buttons and scroll bars for selecting trace data. For details, see Chapter 8, "Trace Mode."
- *2: Clicking the Copy, Paste or Default drop-down button displays a menu of settings for selection. For details, see Section 4.3, "Copying, Pasting and Defaulting Settings."
- *3: Clicking the Channel Setting drop-down button displays a menu for displaying each Channel dialog. For details, see Chapter 5, "Control Mode."
- *4: Clicking the Viewer Config drop-down button displays a menu for displaying and giving focus to each Viewer Config window. For details, see Section 4.7, "Chart Display."
- *5: Clicking the Viewer Chart drop-down button displays a menu for displaying and giving focus to the Chart window and each Viewer Chart widow. For details, see Section 4.7, "Chart Display."

The display of the tabs, group boxes and buttons varies with the operation mode (control, monitor, calibration or trace) and the online/offline state. The table below shows the display in each operation mode in online state and offline state.

Tab, group box or button	Online			Offline				
	Control	Monitor	Calibration	Control	Monitor	Calibration	Trace	
Home	O	O	O	O	O	O	O	
DTS Control	O	O	O	X	X	X	X	
		Connect						
		Start						
		Stop						
Wizard	X	X	O	X	X	Δ	X	
		Fiber Connection						
		Fiber Parameter						
Trace	X	X	X	X	X	X	O	
Edit	O	O	O	O	O	O	O	
								Copy
								Paste
								Default
View	O	O	O	O	O	O	O	
Setting	O	O	O	O	O	O	O	
								Sequence setting
								Channel Setting
Configuration	O	O	O	O	O	O	O	
								CSV Save Config
								Trace Storage Config
								Viewer Config
Windows	O	O	O	O	O	O	O	
								Solution Tree
								Viewer Chart
								Message
								Alarm
								Default Layout
Tool	O	X	O	X	X	X	X	

- O Displayed
- Δ Displayed but not selectable
- X Not displayed

Home tab in online control mode



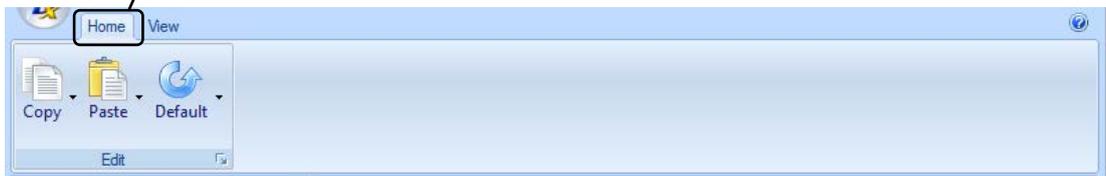
Home tab in online monitoring mode



Home tab in online calibration mode



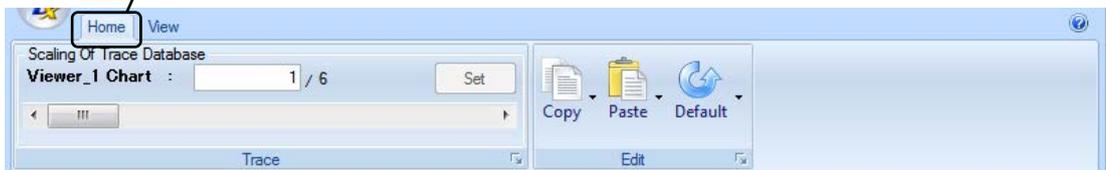
Home tab in offline control or monitoring mode

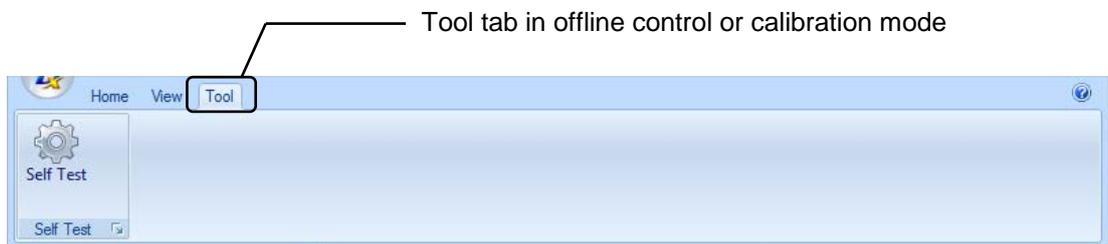
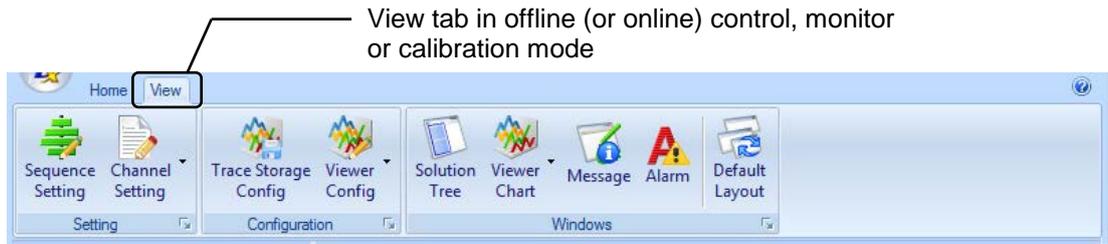


Home tab in offline calibration mode



Home tab in offline trace mode





- **Help button**

The Help button is displayed near the top right corner of the main window. Clicking the Help button displays the Information dialog window.

SEE ALSO

For details, see Section 4.10, "Help."



- **Status bar**

The Status bar is displayed at the bottom of the main window. It displays the DTSX200 connection status and measurement status.

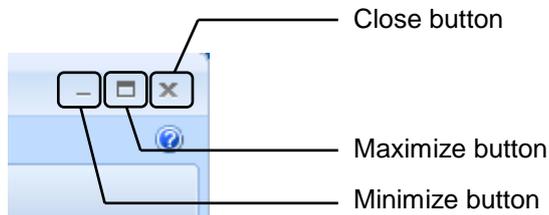
SEE ALSO

For details, see Section 4.6, "Status Display."



- **Other buttons**

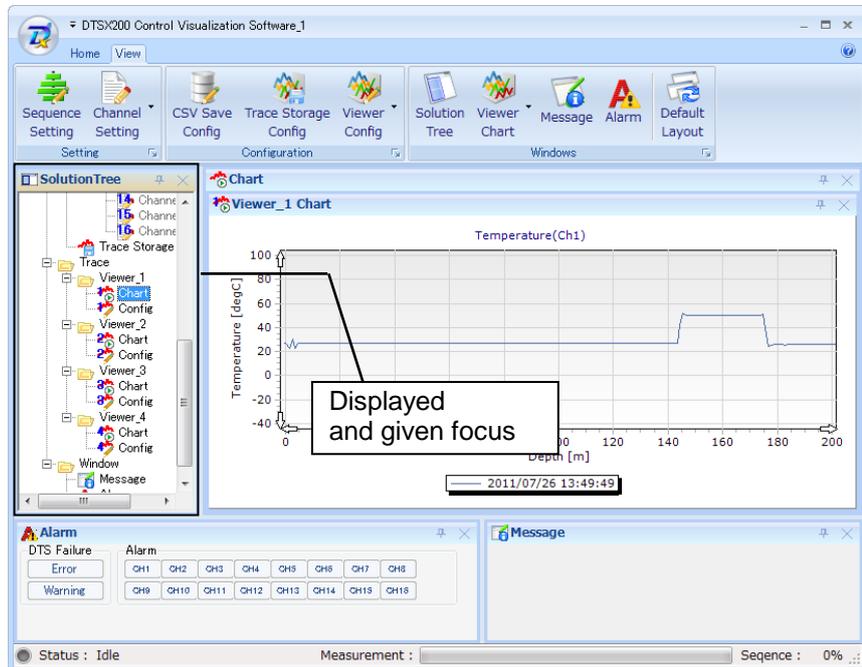
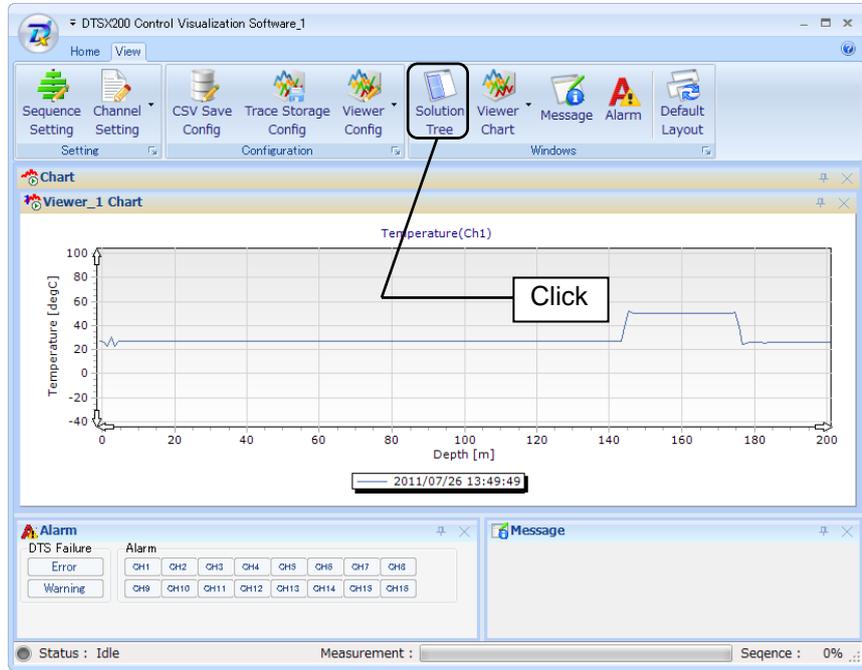
The Minimize button, Maximize/Reduce button and the Close button are displayed at the top right corner of the main window.



4.1.3 Solution Tree Window

Selecting View>Windows>Solution Tree displays (or if already displayed, gives focus to) the Solution Tree window. The table below lists the functions of the Solution Tree window.

The Solution Tree window can be used to display other windows and dialogs, to copy settings and perform other operations.



- **Solution Tree window layout**

The Solution Tree window displays nodes structured in the form of a tree. The current operation mode (Control, Monitor, Calibration or Trace) is displayed at the top as the root node and the tree of nodes is up to five levels deep.

Nodes displayed at the bottom level are called leaf nodes. Leaf nodes are bolded in the table below. Double-clicking on a leaf node displays its associated window or dialog. Right-clicking on some nodes displays a context menu of functions for loading settings, copying, etc.

Details on window display, dialog display and context menu operations of the Solution Tree window are described later in this chapter.

The table below shows the tree structure of the nodes.

TIP

- In online state, individual nodes for displaying dialogs may be enabled or disabled depending on the state of the DTSX200. Double-clicking on a disabled node will not display its associated dialog.

Node Name	Description
Control, Monitor, Calibration or Trace	Root node displaying the operation mode
CSV Save Config	Node for displaying the CSV Save Config dialog
Wizard	Group node for calibration related nodes
Fiber Connection	Node for running the Fiber Connection Calibration Wizard
Fiber Parameter	Node for running the Fiber Parameter Calibration Wizard
Setting	Group node for settings-related nodes
User Setting	Node for grouping and operating user settings related nodes.
Sequence Setting	Node for displaying and operating the Sequence Setting dialog
Channel Setting	Group node for channel related nodes
Channel_1-16 (*1)	Nodes for displaying and operating Channel_1-16 dialogs
Trace Storage Config	Node for displaying and operating the Trace Storage Config dialog
Trace	Group node for nodes related to measurement data chart display and configuration.
Viewer_1- 4 (*2)	Group node for chart display and chart configuration for Viewer_1 to Viewer_4 windows.
Chart	Node for displaying and giving focus to Viewer_n Chart window (n matches the number of the parent node) along with Chart window.
Config	Node for displaying and operating Viewer_n Config dialog (n matches the number of the parent node.)
Window	Group node for window display related nodes
Message	Node for displaying and giving focus to the Message window
Alarm	Node for displaying and giving focus to the Alarm window
Self Test	Node for displaying the Self Test dialog

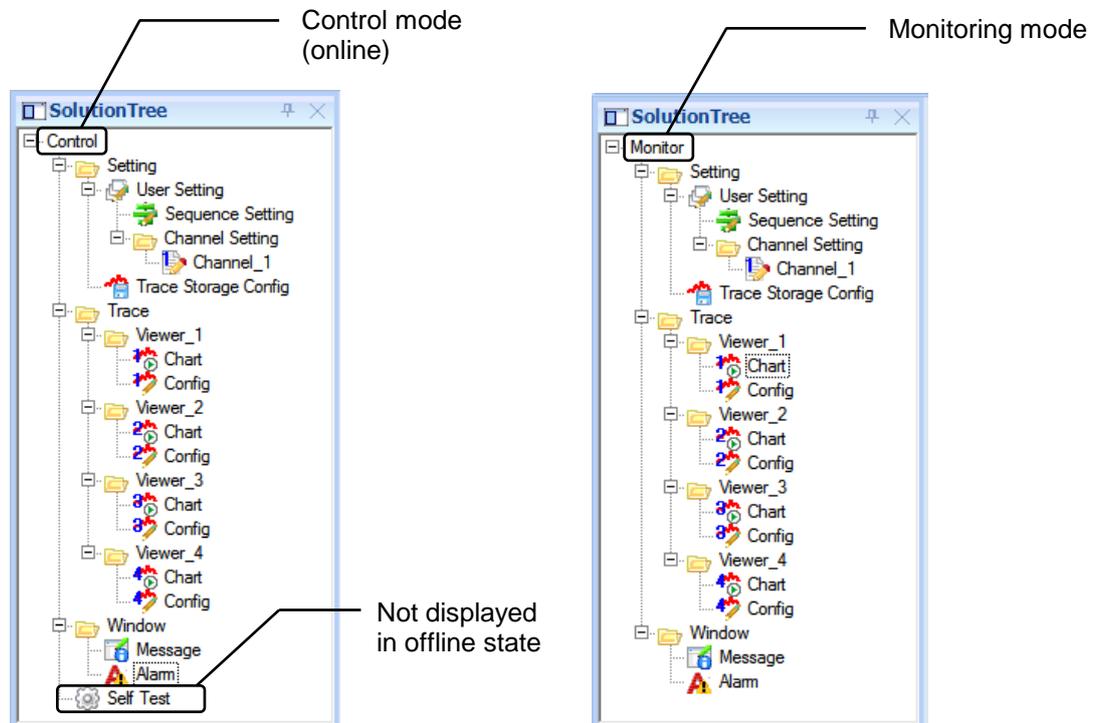
*1: In online state, nodes are displayed for the number of channels installed in the DTSX200.
 In offline state, nodes are displayed for the number of channels selected in the Select Switch dialog.

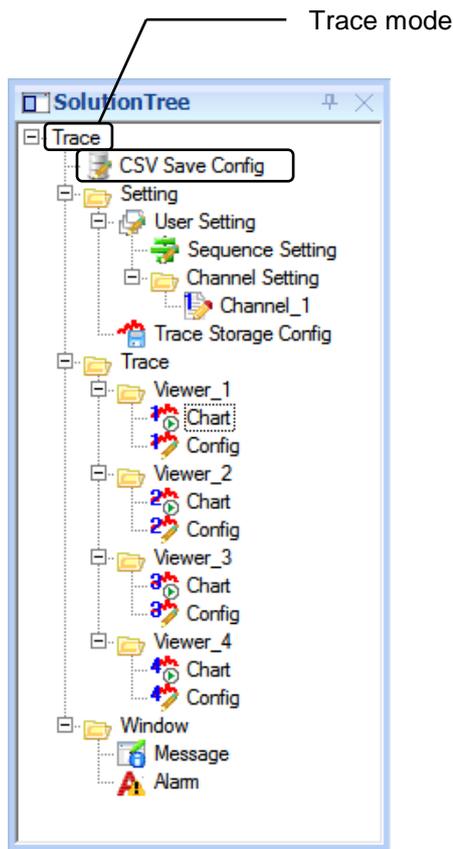
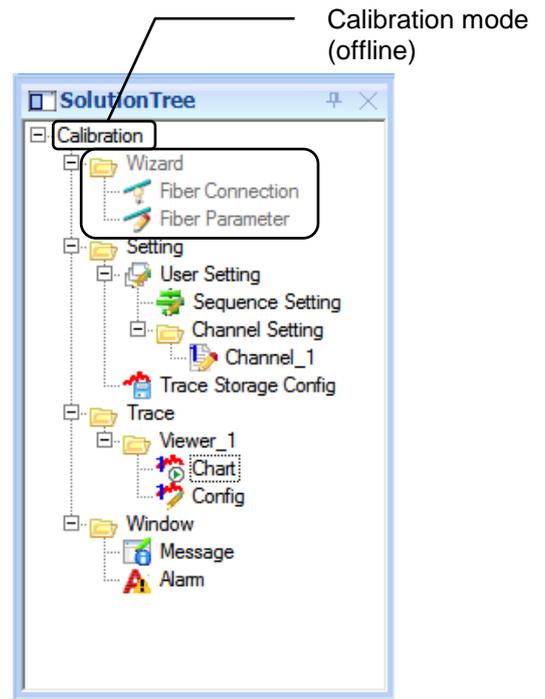
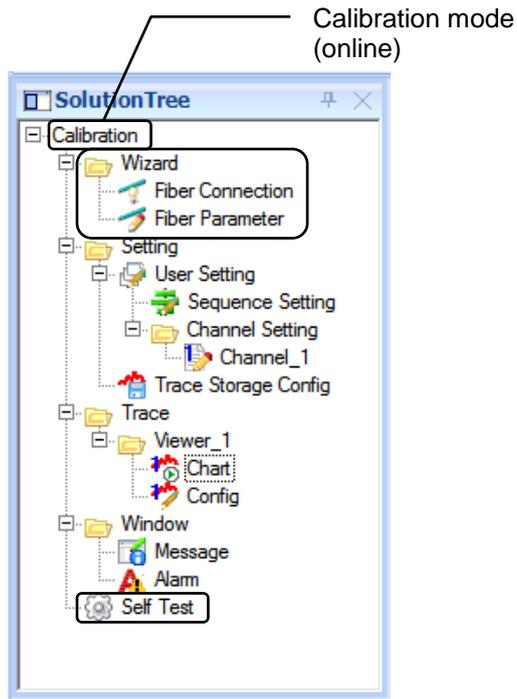
*2: Only Viewer_1 is displayed in Calibration mode.

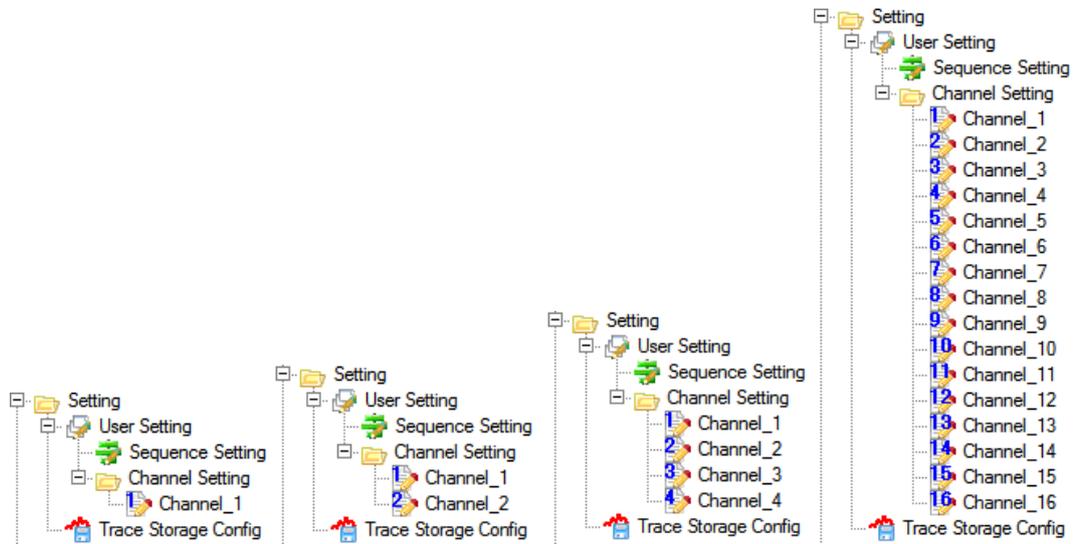
The display of the nodes varies with the operation mode (Control, Monitor, Calibration or Trace) and the online/offline state. The table below shows the display in each operation mode in online state and offline state.

Node Name	Online			Offline			
	Control	Monitor	Calibration	Control	Monitor	Calibration	Trace
Control, Monitor, Calibration or Trace	Control	Monitor	Calibration	Control	Monitor	Calibration	Trace
CSV Save Config	X	X	X	X	X	X	O
Wizard							
Fiber Connection	X	X	O	X	X	Δ	X
Fiber Parameter							
Setting							
User Setting	O	O	O	O	O	O	O
Sequence Setting							
Channel Setting							
Channel_1-16	O(*1)	O(*1)	O(*1)	O(*2)	O(*2)	O(*2)	O(*2)
Trace Storage Config	O	O	O	O	O	O	O
Trace							
Viewer_1 to 4	O	O	O	O	O	O	O
Chart							
Config			O(*3)			O(*3)	
Window							
Message	O	O	O	O	O	O	O
Alarm							
Self Test	O	X	O	X	X	X	X

- O Displayed
- Δ Displayed but not selectable
- X Not displayed
- *1: Nodes are displayed for the number of channels installed in the DTSX200.
- *2: Nodes are displayed for the number of channels selected in the Select Switch dialog.
- *3: Only Viewer_1 is displayed.







Number of channels=1 Number of channels=2 Number of channels=4 Number of channels=16

● **Context menus**

In the Solution Tree window, right-clicking on a node **bolded** in the table below displays its associated context menu.

The table below shows the mapping between context menus and nodes.

Node Name	Control	Monitor	Calibration	Trace
Control, Monitor, Calibration or Trace	I(*1)	II(*1)	I(*1)	X
CSV Save Config				X
Wizard				
Fiber Connection			X	
Fiber Parameter				
Setting	X	X	X	X
User Setting	III	IV	III	IV
Sequence Setting	III	IV	III	IV
Channel Setting	X	X	X	X
Channel_1-16 (*3)	V	IV	V	VI
Trace Storage Config	III	III	III	IV
Trace	X	X	X	X
Viewer_1 to 4 (*4)	X	X	X	X
Chart	X	X	X	X
Config	V	V	V	V
Window	X	X	X	X
Message	X	X	X	X
Alarm	X	X	X	X
Self Test	X (*2)		X (*2)	

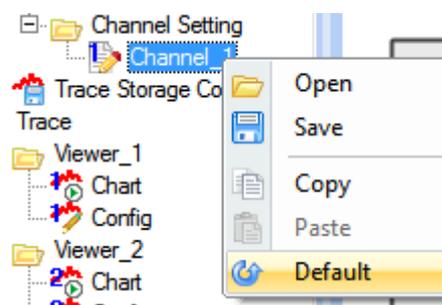
*1: Context menu is displayed only in online state.
 *2: Node is displayed only in online state.
 *3: In online state, nodes are displayed for the number of channels installed in the DTSX200. In offline state, nodes are displayed for the number of channels selected in the Select Switch dialog.
 *4: Only Viewer_1 is displayed in Calibration mode.
 / Node is not displayed.
 X Node has no context menu.
 I to VI: context menu
 (see text on the right for details)
 I Connect/Start/Stop
 II Connect

- III Open/Save/Default
- IV Save
- V Open/Save/Copy/Paste/Default
- VI Save/Copy/Paste

Operation Type	Item	Description
DTSX200 operations	Connect	Displays dialog for connection to DTSX200.
	Start	Starts measurement.
	Stop	Stops measurement.
Settings operations	Open	Loads settings file for the node.
	Save	Saves settings file for the node.
	Copy	Copies settings for the node.
	Paste	Pastes settings for the node.
	Default	Initializes settings for the node.



Context menu for DTSX200 control



Context menu for settings manipulation

TIP

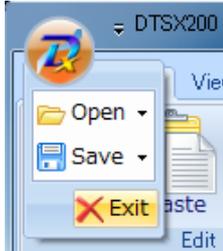
- In online state, individual nodes with context menus may be enabled or disabled depending on the state of the DTSX200. Right-clicking on a disabled node will not display its associated context menu.
- In online state, individual menu items on a displayed context menu may be enabled or disabled depending on the state of the DTSX200. A disabled context menu item cannot be selected.
- Operations on the context menu of the User Setting node apply to the combined settings of the Sequence Setting and Channel Setting nodes just below it.

4.2 Loading and Saving Settings

Settings specified using the software can be saved to or loaded from a settings file either from the Start menu of the main window or from a context menu in the Solution Tree window.

4.2.1 Loading and Saving Settings from the Start Menu

This subsection describes how to load and save settings from the Start menu of the main window by selecting Start menu>Open and Start menu>Save respectively.



Clicking Open or Save on the Start menu displays a cascade menu of settings type. Selecting a settings type to be loaded or saved from the displayed menu displays a corresponding open/save dialog.

The table below lists each Open or Save menu option along with the open/save dialog displayed and the settings file loaded or saved when the option is selected from the menu.

Open menu or Save menu	Open/Save Dialog Displayed, Settings File Type	File Extension
User Setting	"Open/Save a user setting file" dialog Settings file combining Sequence Setting and settings for Channel_1 to 16	*.dua
Sequence Setting	"Open/Save a sequence setting file" dialog Sequence settings file	*.dus
Channel Setting (*1)		
Channel_1 to 16 (*2)	"Open/Save a channel setting file" dialog Channel settings file (separate operation for Channel_1 to 16)	*.duc
Viewer Config (*3)		
Viewer_1 to 4 (*4)	"Open/Save a viewer configuration file" dialog Setting files for charts 1 to 4 (separate operation for Viewer_1 to 4)	*.dug
Trace Storage Config	"Open/Save a trace storage configuration file" dialog Trace storage configuration file	*.dur

*1: Displays menu options for Channel_1 to 16.

*2: In online state, menu options are listed for the number of channels installed in the DTSX200.

In offline state, menu options are listed for the number of channels selected in the Select Switch dialog.

*3: Displays menu options for Viewer_1 to 4.

*4: Only Viewer_1 is displayed in Calibration mode.

TIP

- The User Setting menu option combines Sequence Setting and Channel Setting (settings for Channel_1 to Channel_16). It can be used for loading or saving sequence settings and all channel settings for a DTSX200 in one go. If the DTSX200 is installed with less than the maximum of 16 channels, settings for uninstalled channels are disabled.

The menu displayed when Start>Open is selected varies with the operation mode. Moreover, some menu items are disabled during measurement and disconnection in online state. The table below shows these dependencies.

Open menu	Control	Monitor	Calibration	Trace
User Setting	O(*1)	X	O(*1)	X
Sequence Setting	O(*1)	X	O(*1)	X
Channel Setting	O(*1)	X	O(*1)	X
Channel_1-16 (*2)				
Viewer Config	O	O	O	O
Viewer_1-4 (*3)				
Trace Storage Config	O(*1)	O(*1)	O(*1)	X

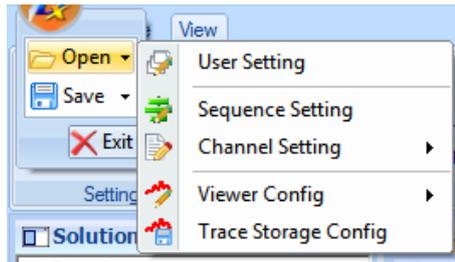
O Displayed.

X Not displayed.

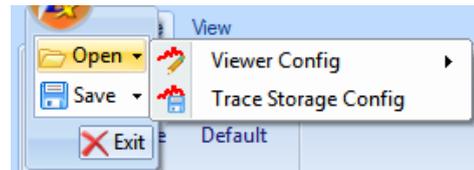
*1: Disabled during measurement or disconnection in online state.

*2: In online state, menu options are listed for the number of channels installed in the DTSX200.
In offline state, menu options are listed for the number of channels selected in the Select Switch dialog.

*3: Only Viewer_1 is displayed in Calibration mode.



Open menu in control or calibration mode



Open menu in monitoring mode

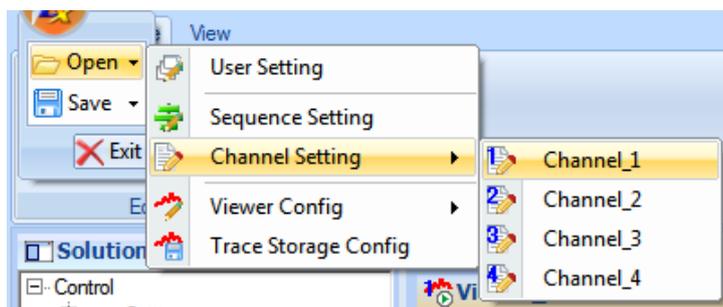


Open menu in trace mode

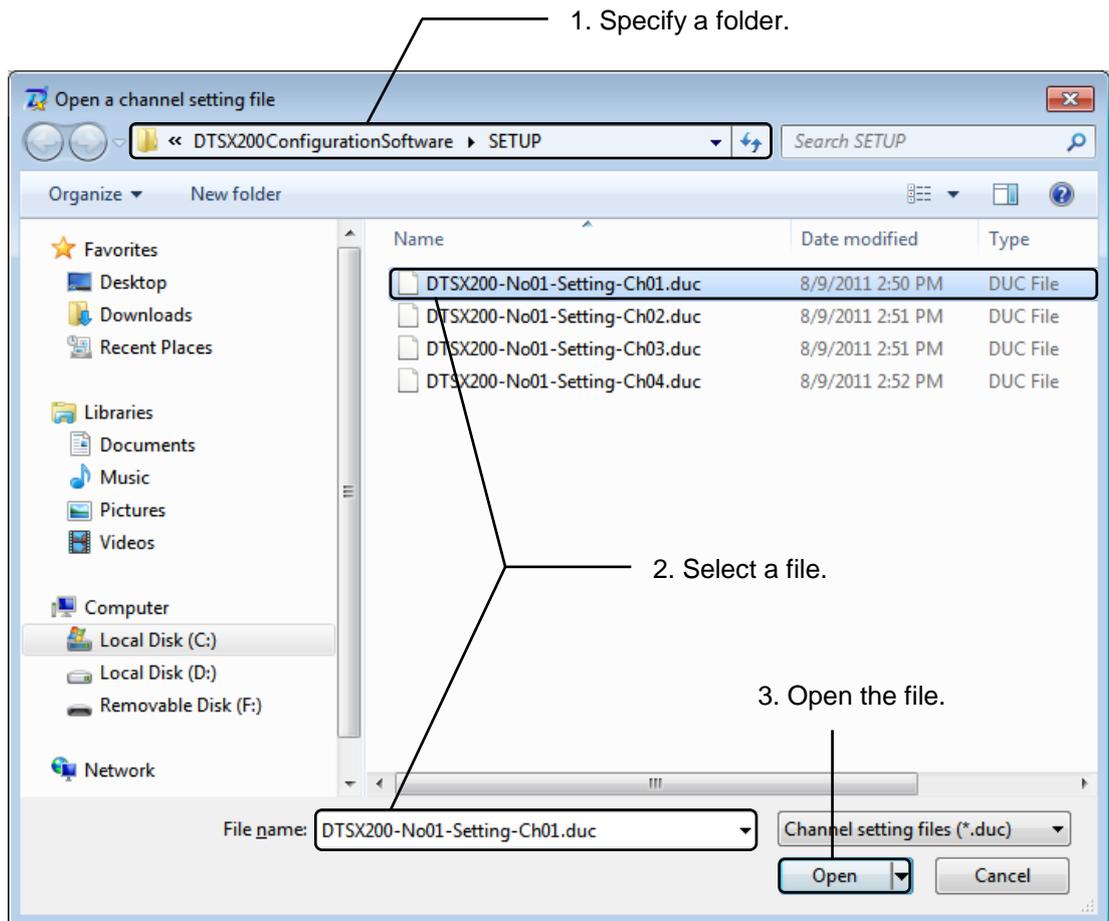
● **Procedure for loading settings (in main window)**

We describe the procedure below using an example for loading channel settings of Channel 1.

1. Select Start menu>Open>Channel Setting>Channel_1. (The “Open a channel setting file” dialog is displayed.)



2. Specify the folder containing the channel settings file to be loaded.
3. Select the channel settings file to be loaded and click [Open]. (The “Open a channel setting file” dialog closes.)



After loading is completed, you can check the loaded channel settings by selecting View> Setting>Channel Setting>Channel_1 to display the Channel_1 dialog window.

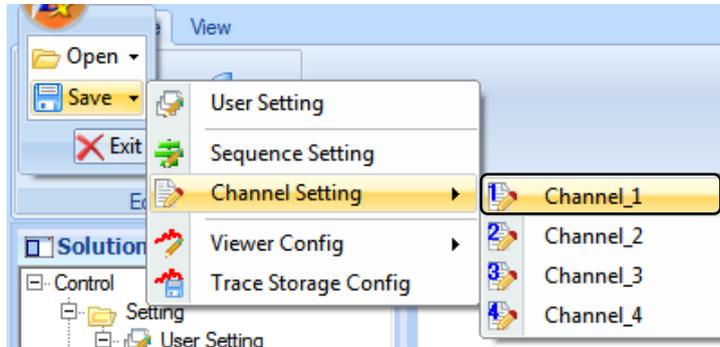
TIP

- In Windows 7, the following folder is specified by default in each Open dialog:
C:\Users\ <user name>\Documents\DTSX200 Control Visualization Software\SETUP

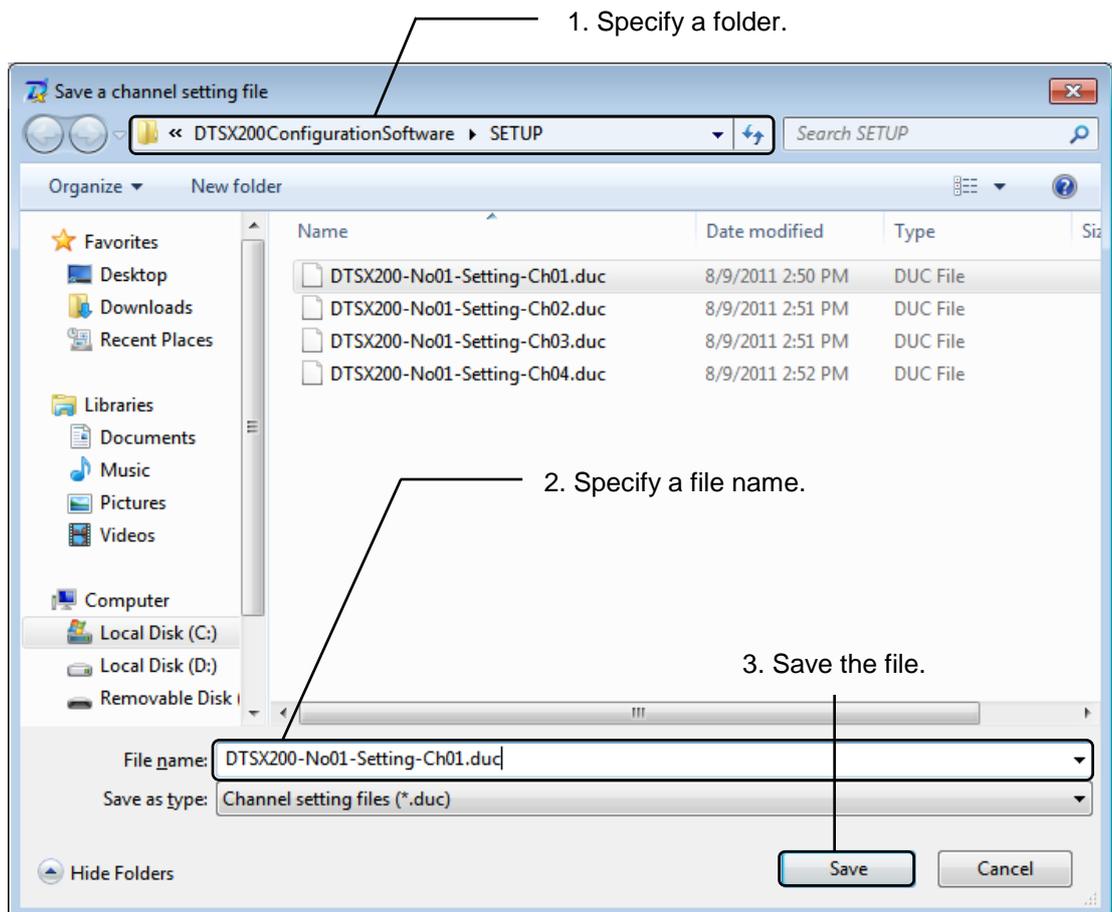
● **Procedure for saving settings (in main window)**

We describe the procedure below using an example for saving channel settings of Channel 1.

1. Select Start menu>Save>Channel Setting>Channel_1. (The “Save a channel setting file” dialog is displayed.)



2. Specify the destination folder for saving the channel settings file.
3. Specify a file name for saving the channel settings and click [Save]. (The “Save a channel setting file” dialog closes.)



TIP

- In Windows 7, the following destination folder is specified by default in each Save dialog window:
C:\Users<user name>\Documents\DTSX200 Control Visualization Software\SETUP

4.2.2 Loading and Saving Settings from Context Menu

This subsection describes how to load and save settings from a context menu in the Solution Tree window by right-clicking on a node and selecting Open and Save respectively from the displayed context menu.

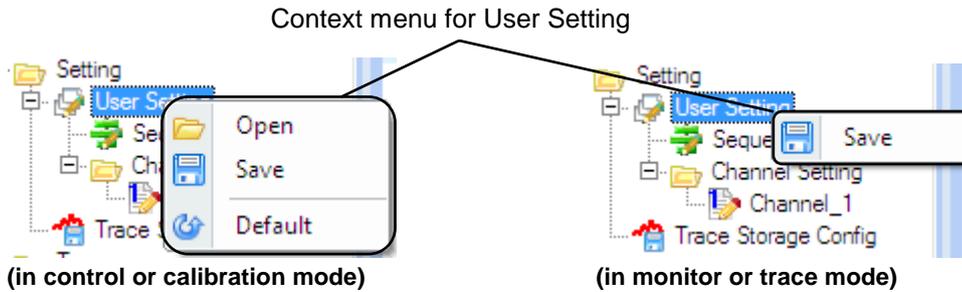
Whether both Open and Save or only Save is displayed in the context menu of a node depends on the operation mode. Moreover, Open is disabled during measurement and disconnection in online state for some nodes. The table below shows these dependencies.

Node	Display of Open and Save in Context Menus in Each Mode			
	Control	Monitor	Calibration	Trace
User Setting	Open (*1)/Save	Save	Open (*1)/Save	Save
Sequence Setting	Open (*1)/Save	Save	Open (*1)/Save	Save
Channel Setting				
Channel_1-16 (*2)	Open (*1)/Save	Save	Open (*1)/Save	Save
Trace Storage Config	Open (*1)/Save	Open (*1)/Save	Open (*1)/Save	Save
Viewer_1 to 4 (*3)				
Config	Open/Save	Open/Save	Open/Save	Open/Save

*1: Disabled during measurement or disconnection in online state.

*2: In online state, nodes are displayed for the number of channels installed in the DTSX200. In offline state, nodes are displayed for the number of channels selected in the Select Switch dialog.

*3: Only Viewer_1 is displayed in Calibration mode.



TIP

- The context menu of the User Setting node combines Sequence Setting and Channel Setting (settings for Channel_1 to Channel_16). It can be used for loading or saving sequence settings and all channel settings for a DTSX200 in one go. If the DTSX200 is installed with less than the maximum of 16 channels, settings for uninstalled channels are disabled.

The table below shows the open or save dialog displayed and the settings file loaded or saved when Open or Save is selected from the context menu of each node.

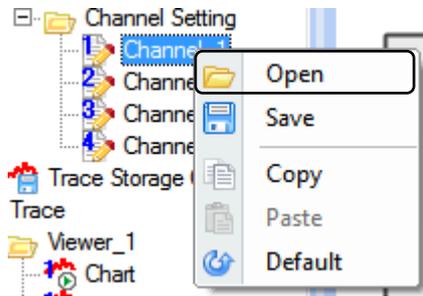
Node	Open/Save Dialog Displayed, Settings File Type	File Extension
User Setting	"Open/Save a user setting file" dialog Settings file combining Sequence Setting and settings for Channel_1 to 16	*.dua
Sequence Setting	"Open/Save a sequence setting file" dialog Sequence settings file	*.dus
Channel Setting		
Channel_1-16 (*1)	"Open/Save a channel setting file" dialog Channel settings file (separate operation for Channel_1 to 16)	*.duc
Trace Storage Config	"Open/Save a trace storage configuration file" dialog Trace storage configuration file	*.dur
Viewer_1- 4 (*2)		
Config	"Open/Save a viewer configuration file" dialog window Setting files for charts 1 to 4 (separate operation for Viewer_1 to 4)	*.dug

*1: In online state, nodes are displayed for the number of channels installed in the DTSX200.
In offline state, nodes are displayed for the number of channels selected in the Select Switch dialog.
*2: Only Viewer_1 is displayed in Calibration mode.

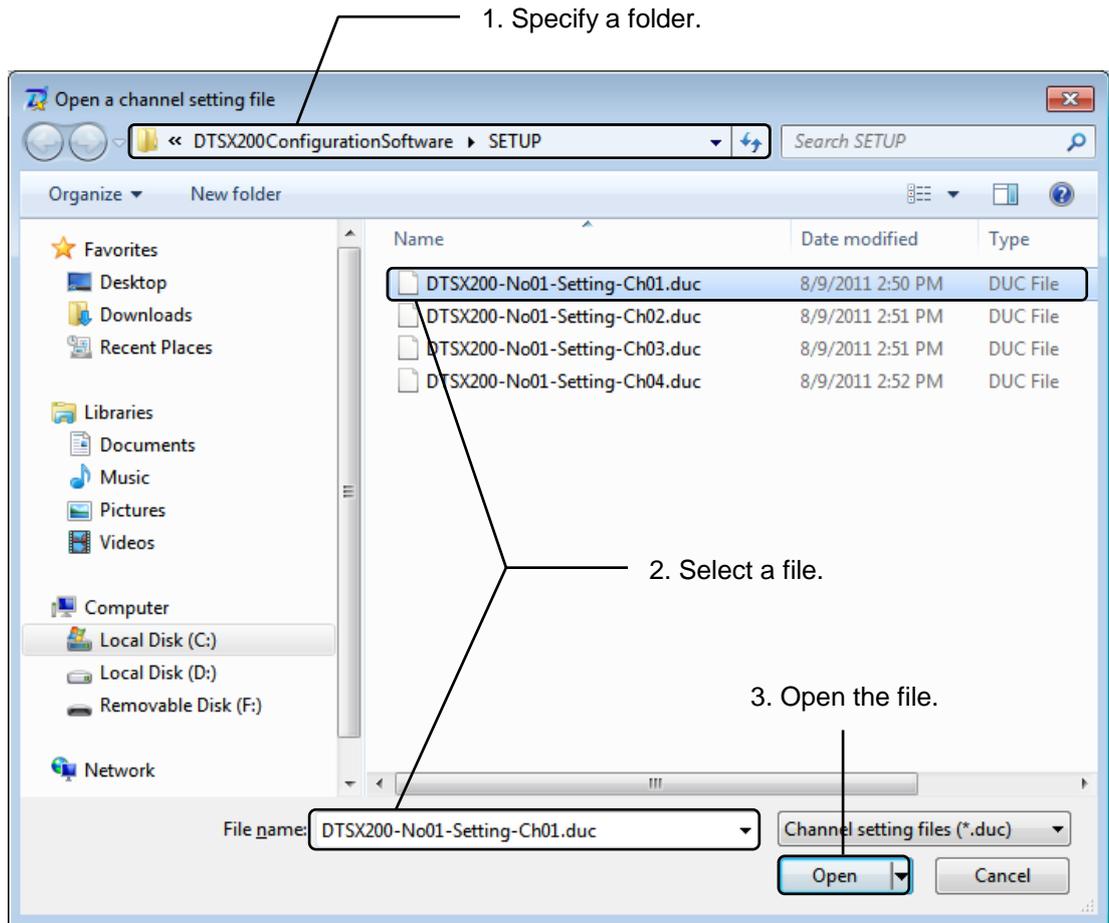
● **Procedure for loading settings (in Solution Tree window)**

We describe the procedure below using an example for loading channel settings of Channel 1.

1. Right-click the Channel_1 node.
2. Select Open from the context menu. (The “Open a channel setting file” dialog is displayed.)



3. Specify the folder containing the channel settings file to be loaded.
4. Select the channel settings file to be loaded and click [Open]. (The “Open a channel setting file” dialog closes.)



After loading is completed, you can check the loaded settings by double-clicking the Channel_1 node to display the Channel_1 dialog window.

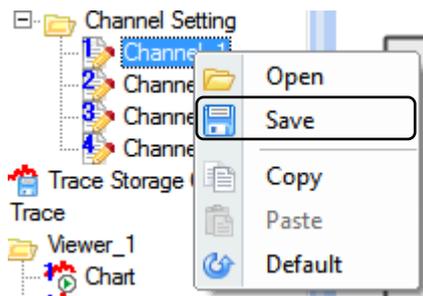
TIP

- In Windows 7, the following folder is specified by default in each Open dialog:
C:\Users\<user name>\Documents\DTSX200 Control Visualization Software\SETUP

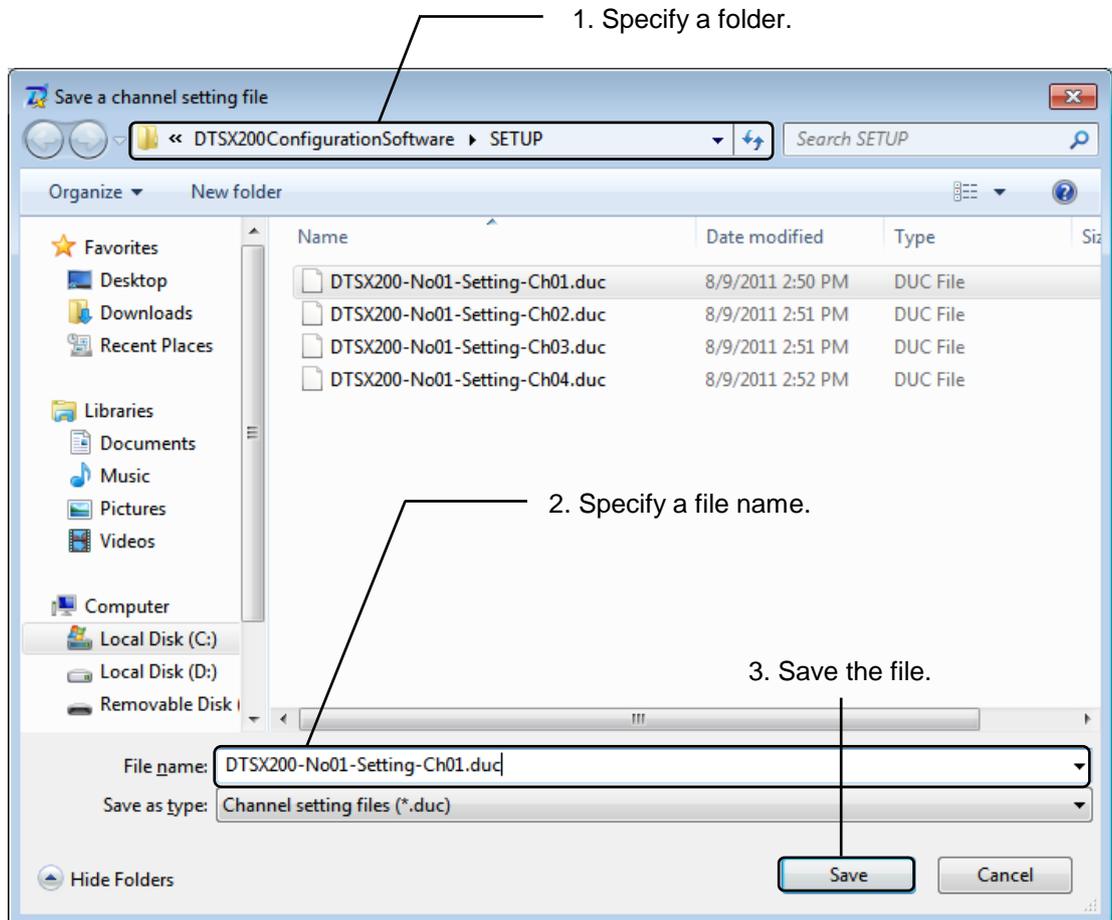
● **Procedure for saving settings (in Solution Tree window)**

We describe the procedure below using an example for saving channel settings of Channel 1.

1. Right-click on the Channel_1 node.



2. Select Save from the context menu. (The “Save a channel setting file” dialog is displayed.)
3. Specify the destination folder for saving the channel settings file.
4. Specify a file name for saving the channel settings and click [Save]. (The “Save a channel setting file” dialog closes.)



4.3 Copying, Pasting and Defaulting Settings

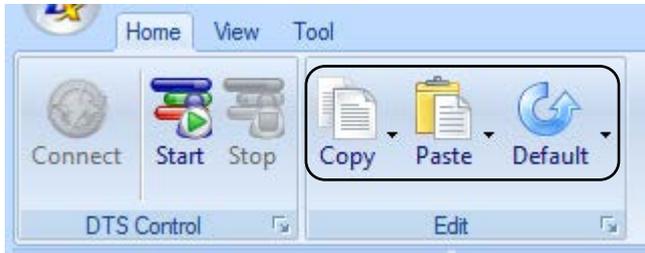
You can copy, paste and initialize (set to default values) settings either from the menu of the main window or from a context menu in the Solution Tree window.

TIP

- You must perform a copy operation before a paste operation.
- A copy operation overwrites previously copied values.
- Settings for one channel or settings for one chart are copied for each copy operation. A copy operation overwrites previously copied values.

4.3.1 Copying, Pasting and Defaulting Settings from the Main Window Menu

This subsection describes how to copy, paste and initialize (default) settings using the main window menu by selecting Home>Edit>Copy, Home>Edit>Paste and Home>Edit>Default respectively.



Clicking Copy, Paste or Default on the menu displays a cascade menu for selecting the type of settings to be copied, pasted or defaulted.

The table below shows the menu displayed when Copy or Paste is clicked on the main window menu.

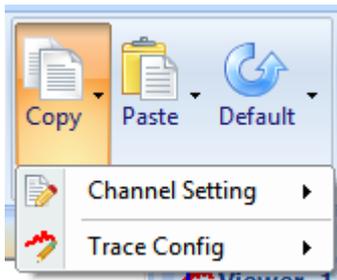
Copy Menu or Paste Menu	Settings Type
Channel Setting (*1)	
Channel_1-16 (*2)	Channel settings
Viewer Config (*3)	
Viewer_1- 4 (*4)	Chart settings

- *1: Displays menu options for Channel_1 to 16.
- *2: In online state, menu options are listed for the number of channels installed in the DTSX200. In offline state, menu options are listed for the number of channels selected in the Select Switch dialog.
- *3: Displays menu options for Viewer_1 to 4.
- *4: Only Viewer_1 is displayed in Calibration mode.

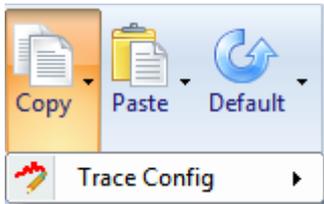
The menu displayed when Copy and Paste is clicked on the main window menu varies with the operation mode. Moreover, some menu items are disabled during measurement and disconnection in online state. The table below shows these dependencies.

Copy Menu or Paste Menu	Control	Monitor	Calibration	Trace
Channel Setting	O(*1)	X	O(*1)	O
Channel_1-16 (*2)				
Viewer Config	O	O	O	O
Viewer_1- 4 (*3)				

- O Displayed.
- X Not displayed.
- *1: Disabled during measurement or disconnection in online state.
- *2: In online state, menu options are listed for the number of channels installed in the DTSX200. In offline state, menu options are listed for the number of channels selected in the Select Switch dialog.
- *3: Only Viewer_1 is displayed in Calibration mode.



Copy menu in control or calibration or trace mode
(Paste menu is similar)



Copy menu in monitor
(Paste menu is similar)

The table below shows the menu displayed when Default is clicked on the main window menu.

Default Menu	Settings Type
User Setting	Combination of Sequence Setting and settings for Channel_1 to 16
Sequence Setting	Sequence settings
Channel Setting (*1)	
Channel_1-16 (*2)	Channel settings
Viewer Config (*3)	
Viewer_1-4 (*4)	Settings for charts 1 to 4
Trace Storage Config	Trace storage configuration

- *1: Displays menu options for Channel_1 to 16.
- *2: In online state, menu options are listed for the number of channels installed in the DTSX200.
In offline state, menu options are listed for the number of channels selected in the Select Switch dialog.
- *3: Displays menu options for Viewer_1 to 4.
- *4: Only Viewer_1 is displayed in Calibration mode.

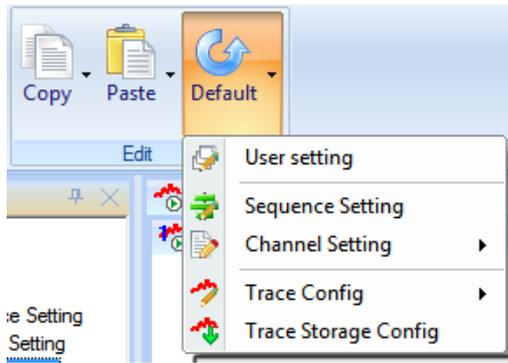
TIP

- The User Setting menu option combines Sequence Setting and Channel Setting (settings for Channel_1 to Channel_16). It can be used for defaulting (initializing) settings and all channel settings for a DTSX200 in one go.

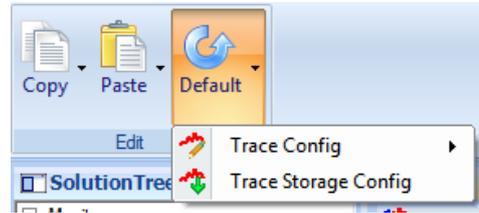
The menu displayed when Default is selected from the main window menu varies with the operation mode. Moreover, some menu items are disabled during measurement and disconnection in online state. The table below shows these dependencies.

Default Menu	Control	Monitor	Calibration	Trace
User Setting	O(*1)	X	O(*1)	X
Sequence Setting	O(*1)	X	O(*1)	X
Channel Setting				
Channel_1-16 (*2)	O(*1)	X	O(*1)	X
Viewer Config				
Viewer_1-4 (*3)	O	O	O	O
Trace Storage Config	O(*1)	O(*1)	O(*1)	X

- O Displayed.
- X Not displayed.
- *1: Disabled during measurement or disconnection in online state.
- *2: In online state, menu options are listed for the number of channels installed in the DTSX200.
In offline state, menu options are listed for the number of channels selected in the Select Switch dialog.
- *3: Only Viewer_1 is displayed in Calibration mode.



Default menu in Control or Calibration mode



Default menu in Monitoring mode

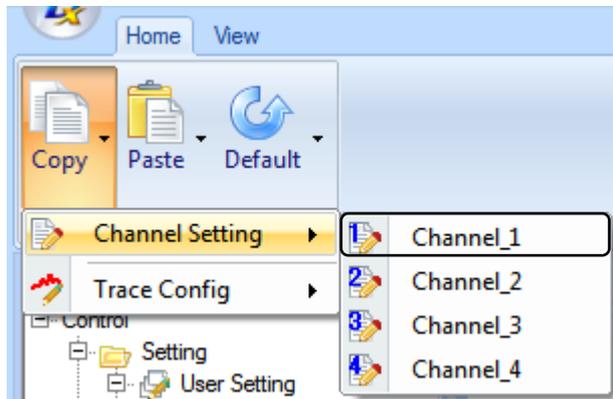


Default menu in Trace mode

- **Procedure for copying settings (in main window)**

We describe the procedure below using an example for copying channel settings of Channel 1.

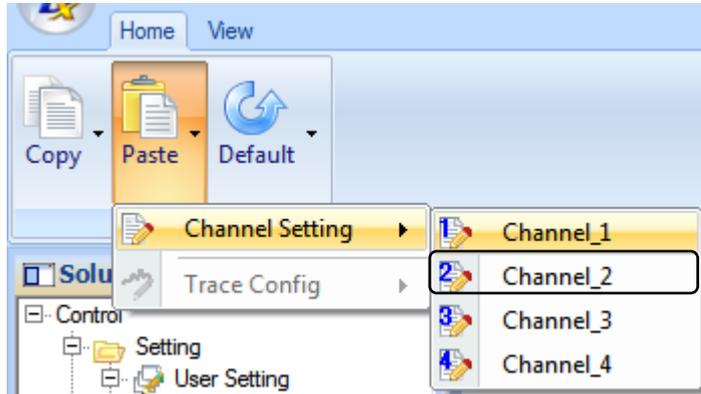
1. Select Home>Copy>Channel Setting>Channel_1.



- **Procedure for pasting settings (in main window)**

We describe the procedure below using an example for pasting to channel settings of Channel 2.

1. Select Home>Paste>Channel Setting>Channel_2.

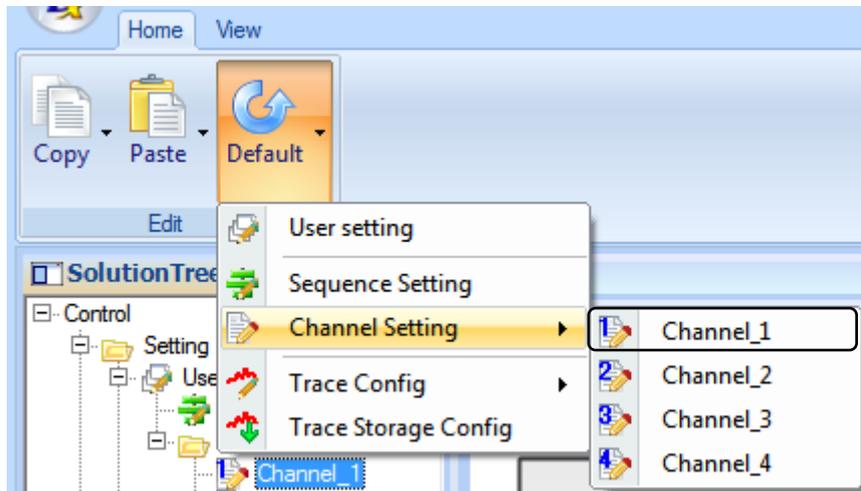


After pasting is completed, you can check the pasted channel settings by selecting View> Setting>Channel Setting>Channel_2 to display the Channel_1 dialog window.

- **Procedure for defaulting settings (in main window)**

We describe the procedure below using an example for defaulting channel settings of Channel 1.

1. Select Home>Default>Channel Setting>Channel_1.



After defaulting is completed, you can check the initialized channel settings by selecting View> Setting>Channel Setting>Channel_1 to display the Channel_1 dialog window.

4.3.2 Copying, Pasting and Defaulting Settings from Context Menu

This subsection describes how to copy, paste and default settings from a context menu in the Solution Tree window by right-clicking on a node and selecting Copy, Paste and Default respectively from the displayed context menu.

Whether Copy, Paste and/or Default are displayed in the context menu of a node depends on the operation mode. Moreover, Paste and Default are disabled during measurement and disconnection in online state for some nodes. The table below shows these dependencies.

Node	Display of Copy, Paste and Default in Context Menus in Each Mode			
	Control	Monitor	Calibration	Trace
User Setting	Default (*1)	X	Default (*1)	X
Sequence Setting	Default (*1)	X	Default (*1)	X
Channel Setting				
Channel_1-16 (*3)	Copy/Paste (*1)/ Default (*1)	X	Copy/Paste (*1)/ Default (*1)	Copy/Paste (*2)
Trace Storage Config	Default (*1)	Default (*1)	Default (*1)	X
Viewer_1- 4 (*4)				
Config	Copy/Paste/ Default	Copy/Paste/ Default	Copy/Paste/ Default	Copy/Paste/ Default

- *1: Disabled during measurement or disconnection in online state.
- *2: Only calculation parameters will be pasted.
For details, see Chapter 5, "Control Mode."
- *3: In online state, nodes are displayed for the no. of channels installed in the DTSX200.
In offline state, nodes are displayed for the no. of channels selected in the Select Switch dialog.
- *4: Only Viewer_1 is displayed in Calibration mode.

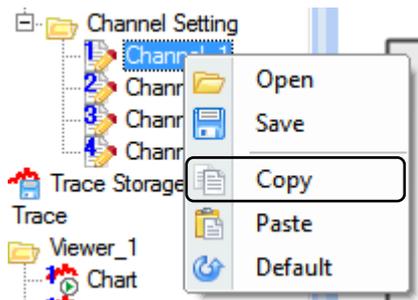
TIP

- The context menu of User Setting combines Sequence Setting and Channel Setting (settings for Channel_1 to Channel_16). It can be used for defaulting sequence settings and all channel settings for a DTSX200 in one go.

● **Procedure for copying settings (in Solution Tree window)**

We describe the procedure below using an example for copying channel settings of Channel 1.

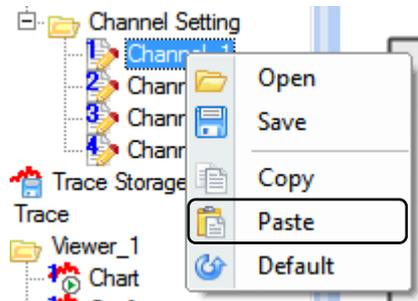
1. Right-click the Channel_1 node.
2. Select Copy from the context menu.



● **Procedure for pasting settings (in Solution Tree window)**

We describe the procedure below using an example for pasting to channel settings of Channel 1.

1. Right-click on the Channel_1 node.
2. Select Paste from the context menu.

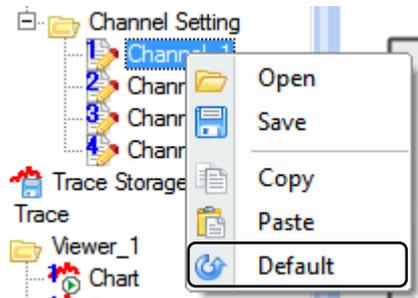


After pasting is completed, you can check the pasted channel settings by double-clicking on the Channel_1 node to display the Channel_1 dialog window.

● **Procedure for defaulting settings (in Solution Tree window)**

We describe the procedure below using an example for defaulting channel settings of Channel 1.

1. Right-click on the Channel_1 node.
2. Select Default from the context menu.



After defaulting is completed, you can check the initialized channel settings by double-clicking on the Channel_1 node to display the Channel_1 dialog window.

4.4 Displaying Windows and Dialogs

This section describes how to display windows and dialogs, as well as basic window operations. Windows and dialogs can be displayed from the menu of the main window or from a node in the Solution Tree window.

A window or dialog can be displayed by clicking on its associated menu button in the main window. If the window is already displayed, it is given focus.

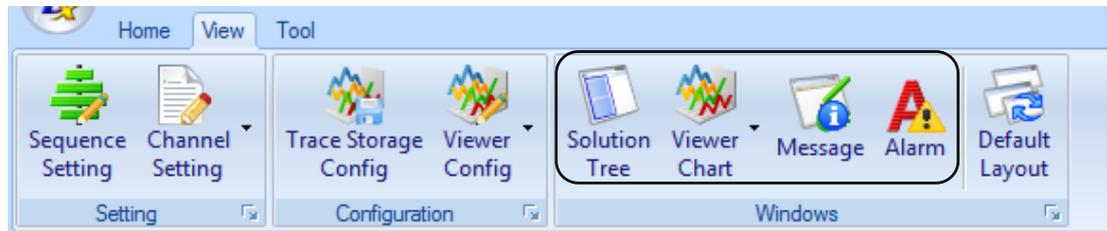
A window or dialog can also be displayed by double-clicking on its associated node in the Solution Tree window. If the window is already displayed, it is given focus.

4.4.1 Menu Items for Displaying Windows (in main window)

This subsection describes the displaying of windows from the main window menu. The table below lists the menu items (tabs, group boxes, buttons and menus) for displaying windows.

Menu Element (Tab, group box, button or menu)	Description
View (tab)	
Windows (group box)	
Solution Tree (button)	Displays and moves focus to Solution Tree window
Viewer Chart (Drop-down button)	
Viewer_1-4 Chart (*1) (menu)	Displays and moves focus to Viewer_1-4 Chart window and Chart window.
Message (button)	Displays and moves focus to Message window
Alarm (button)	Displays and moves focus to Alarm window

*1: Only Viewer_1 is displayed in Calibration mode.

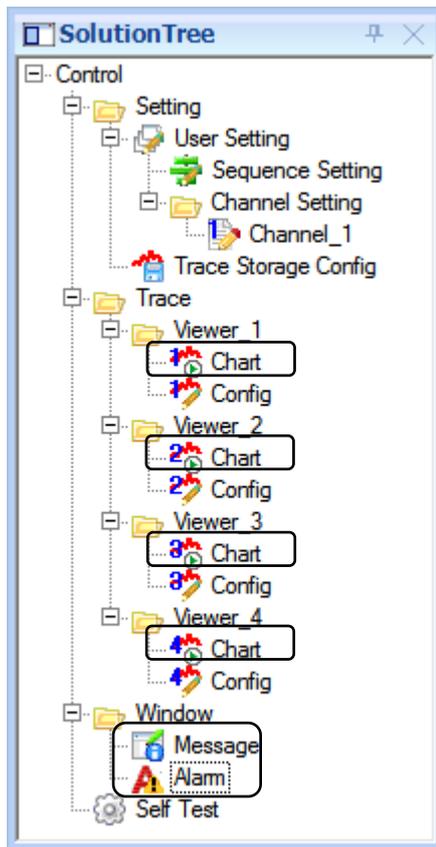


4.4.2 Nodes for Displaying Windows (in Solution Tree Window)

This subsection describes the displaying of windows from a node in the Solution Tree window. The table below lists the nodes for displaying windows.

Node for Displaying Windows	Description
Control, Monitor, Calibration or Trace	
Trace	
Viewer_1-4 (*1)	
Chart	Displays and moves focus to Viewer_n Chart window along with Chart window (n matches the parent node).
Window	
Message	Displays and moves focus to Message window
Alarm	Displays and moves focus to Alarm window

*1: Only Viewer_1 is displayed in calibration mode.



4.4.3 Window Operations

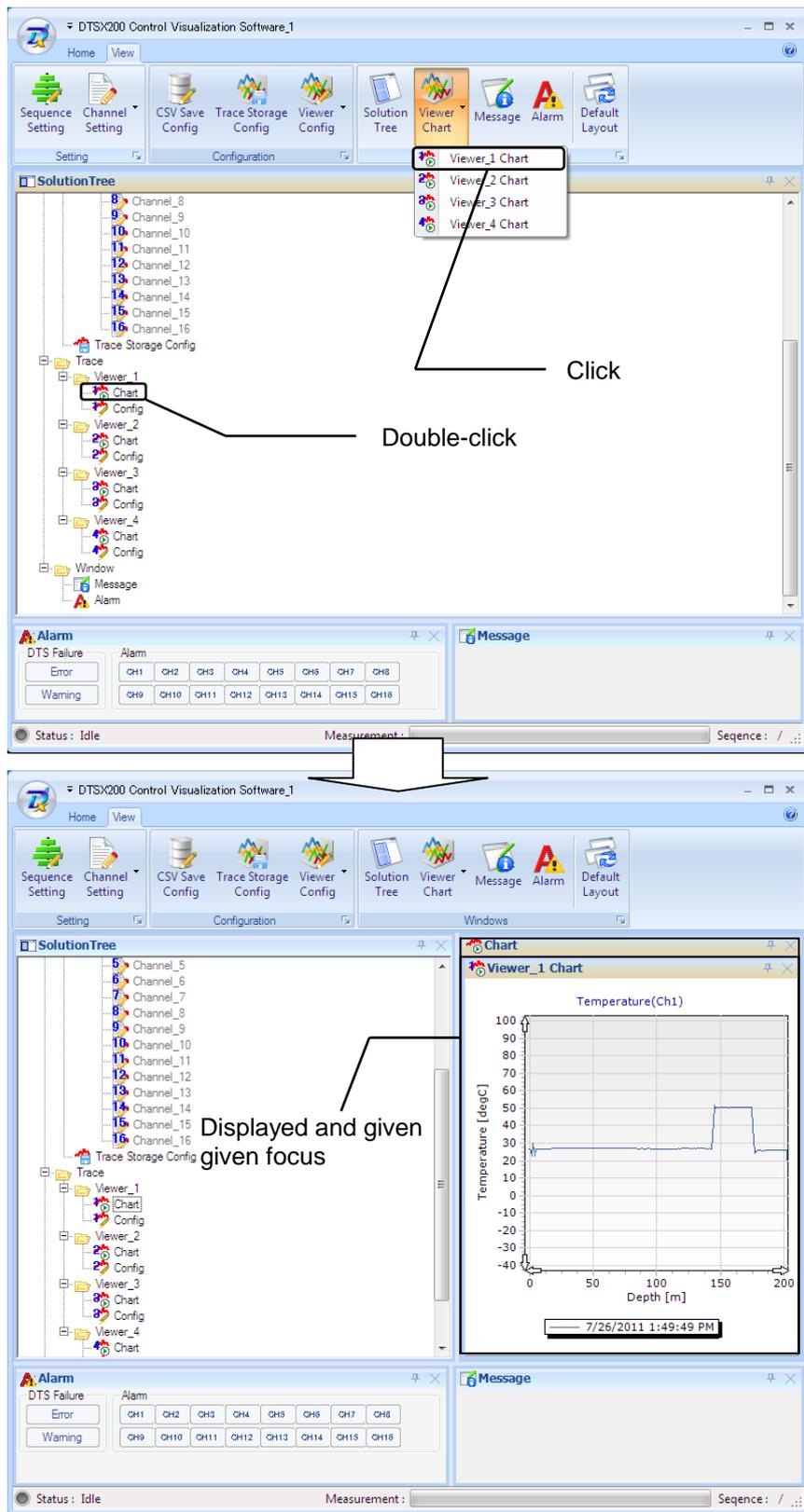
This subsection describes basic window operations.

- **Displaying and giving focus to a window**

A window can be displayed by clicking on its associated menu item in the main window or double-clicking on its associated node in the Solution Tree window. If the window is already displayed, it is given focus.

TIP

- Displaying a Viewer_1-4 Chart window automatically displays the Chart window. This applies similarly when giving focus to the window.

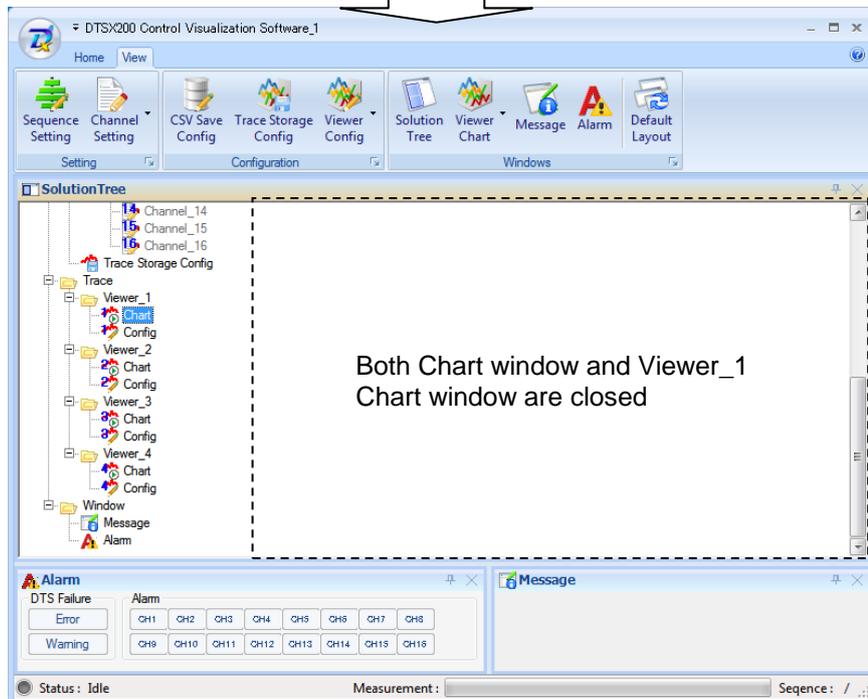
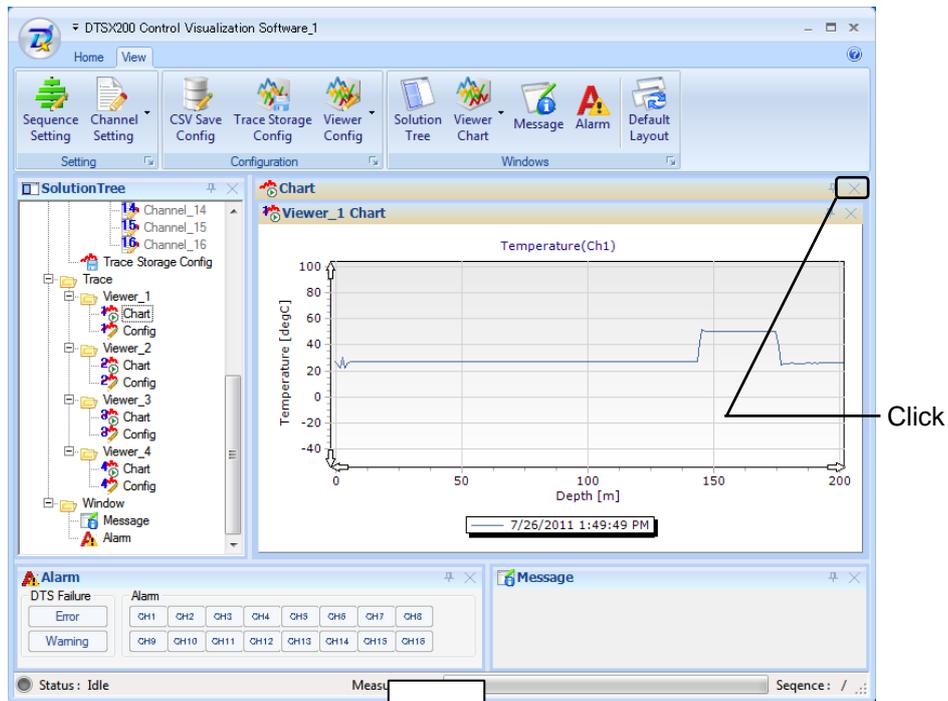


● **Closing a window**

Clicking on the [x] button at the top right corner of a window closes it.

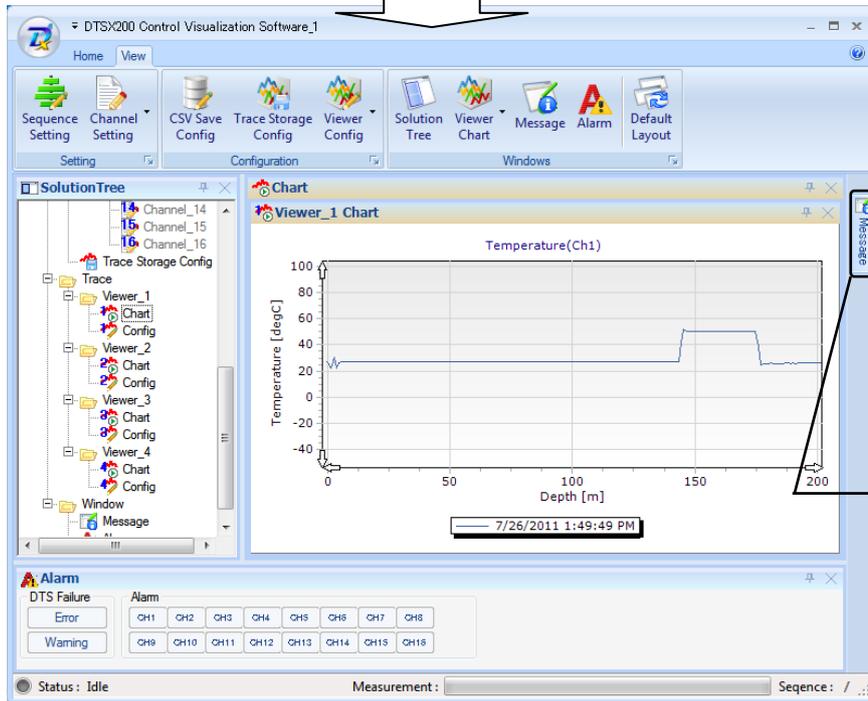
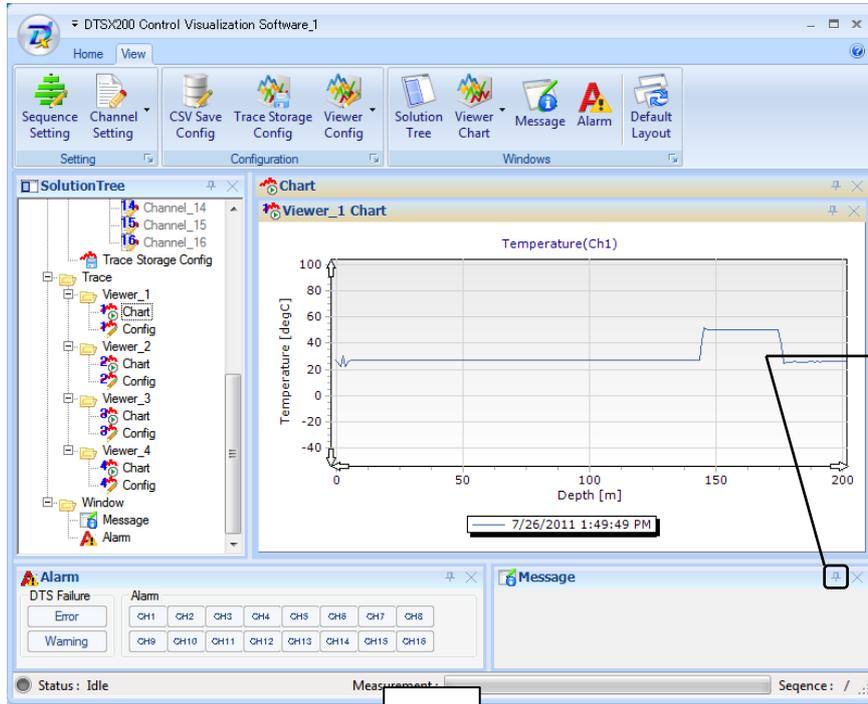
TIP

- Closing a Chart window automatically closes displayed Viewer_1-4 Chart windows.
- Redisplaying a Viewer_1-4 Chart window after closing a Chart window automatically displays previously displayed Viewer_1-4 Chart windows.



● Auto-hiding a window

Clicking on the [] button at the top right corner of a window auto-hides it. An auto-hiding window appears as a tab along one of the four edges of the main window. An auto-hiding Viewer_1-4 Chart window, however, appears as a tab along one of the four edges of the Chart window.



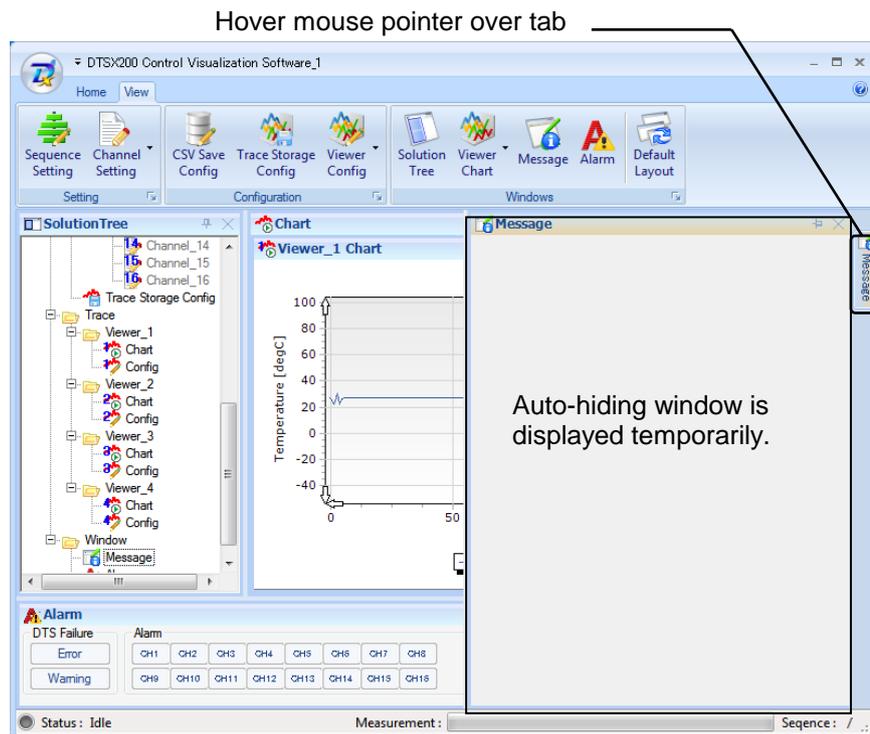
● **Displaying an auto-hiding window temporarily**

Hovering the mouse pointer over the tab of an auto-hiding window displays the window temporarily. Moving the mouse pointer outside the temporarily displayed window auto-hides it again.

Clicking on a temporarily displayed window gives it focus. The window remains displayed until the focus is moved elsewhere.

TIP

- Hovering the mouse pointer over the tab of an auto-hiding window when the application itself is not in focus will not display the window temporarily.



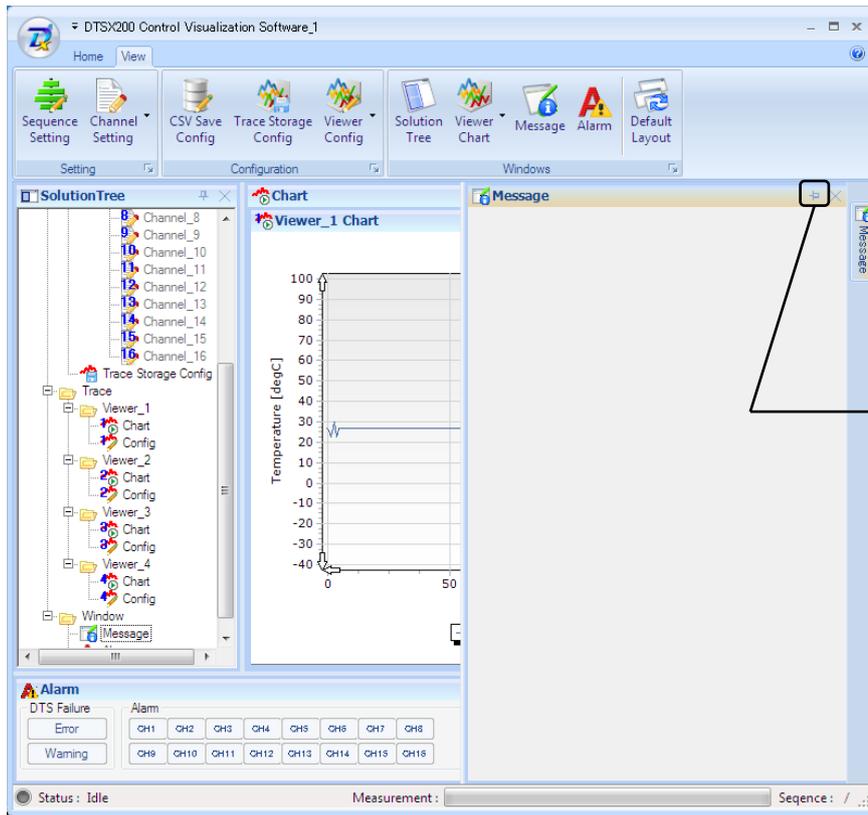
● **Turning off auto-hiding of a window**

There are three ways to turn off auto-hiding of a window:

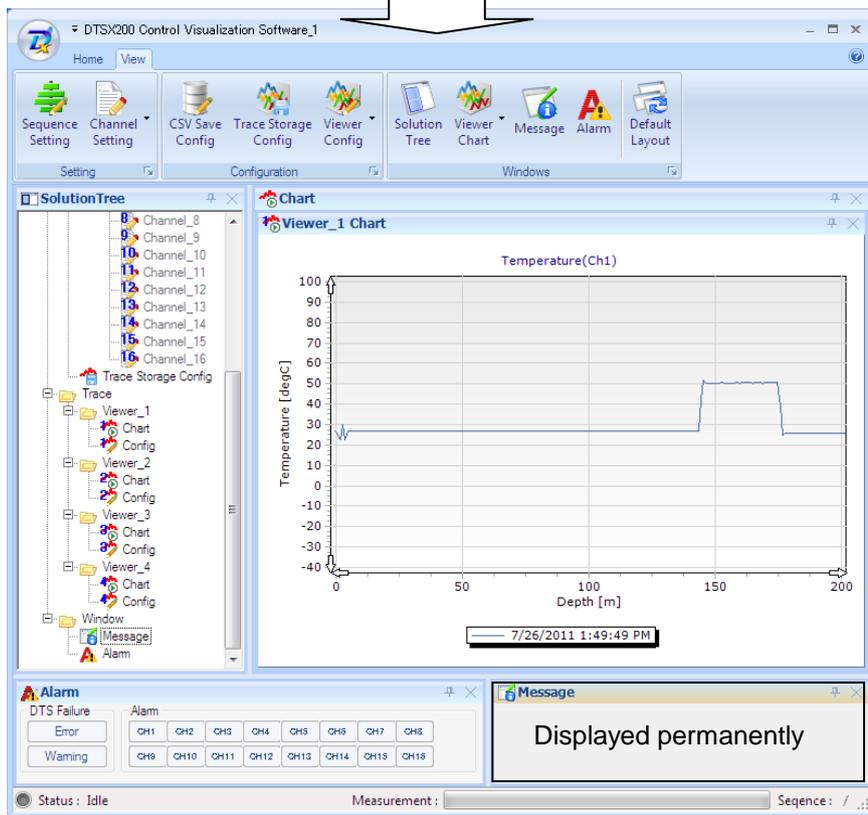
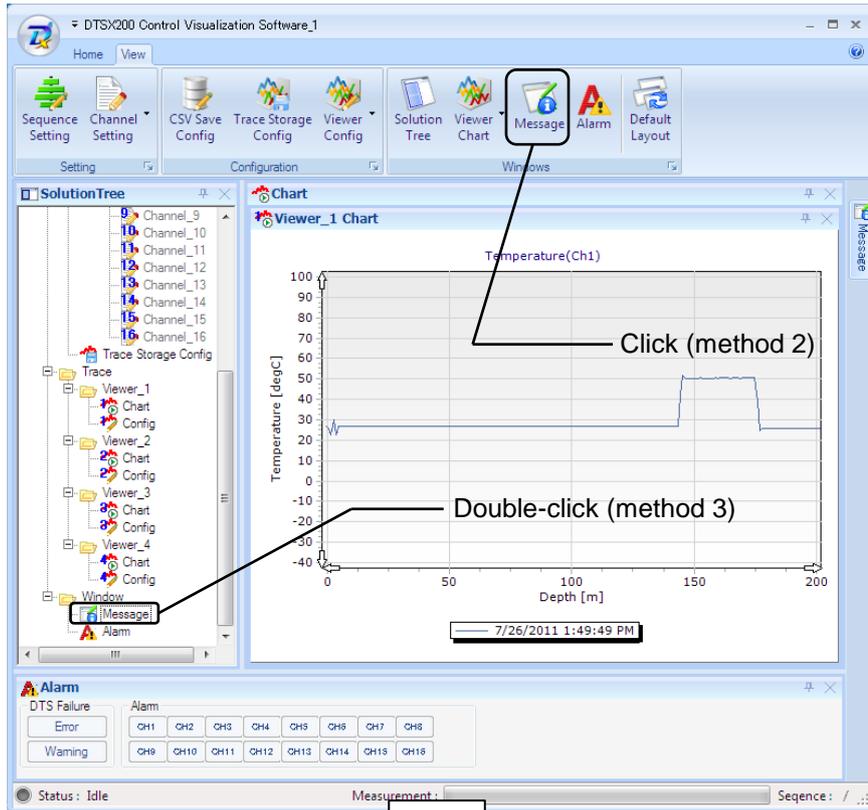
- Method 1: Clicking on [] when the auto-hiding window is temporarily displayed.
- Method 2: Clicking on its associated menu button in the main window.
- Method 3: Double-clicking on its associated node in the Solution Tree window.

TIP

- Auto-hiding of a Chart window can only be cancelled using method 1. Applying method 2 or 3 on a Viewer_1-4 Chart window temporarily displays and gives focus to the Chart window. (The Chart window remains displayed until the focus is moved elsewhere.)



Click (method 1)



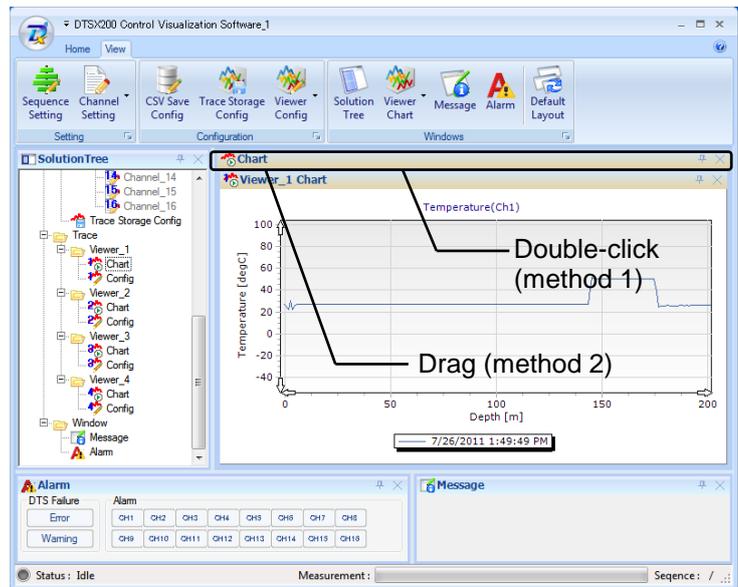
● **Floating a window**

There are two ways to float a window as described below:

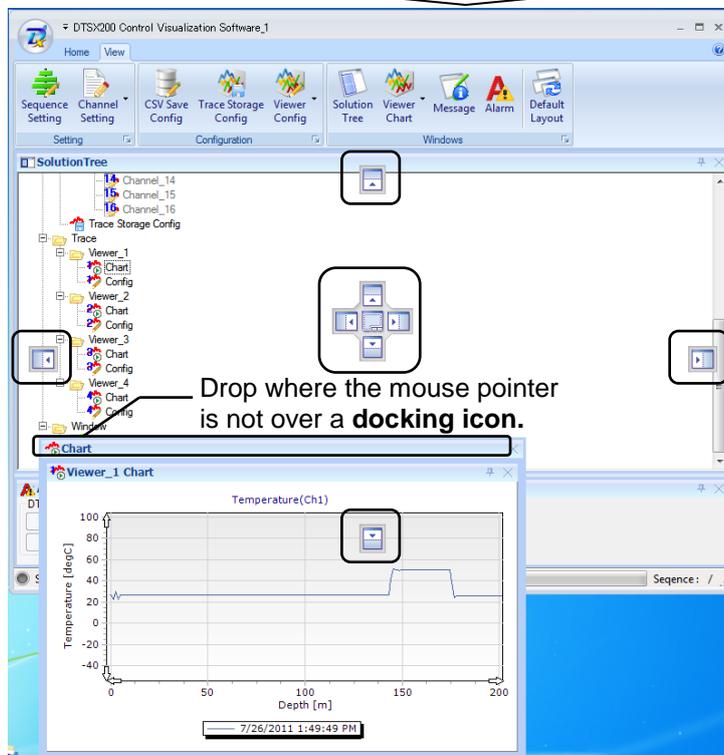
Method 1: Double-click on the title bar of a window to be floated.

Method 2: Drag and drop the title bar of a window to be floated (see procedure below):

1. Drag the title bar of a window to be floated. (Docking icons appear when the title bar is dragged over the display area of another window.)
2. Drop the title bar where the mouse pointer is not over a docking icon.

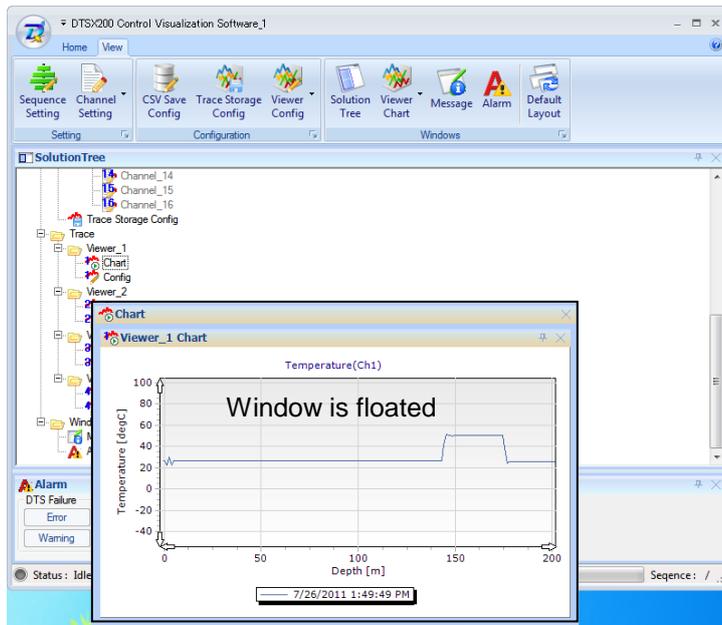


Drag

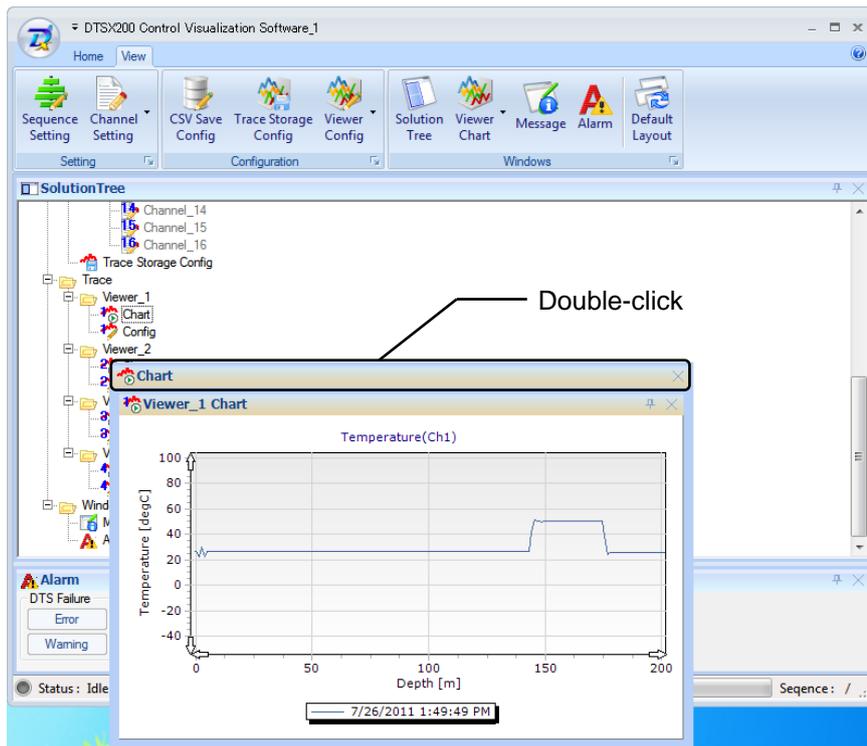


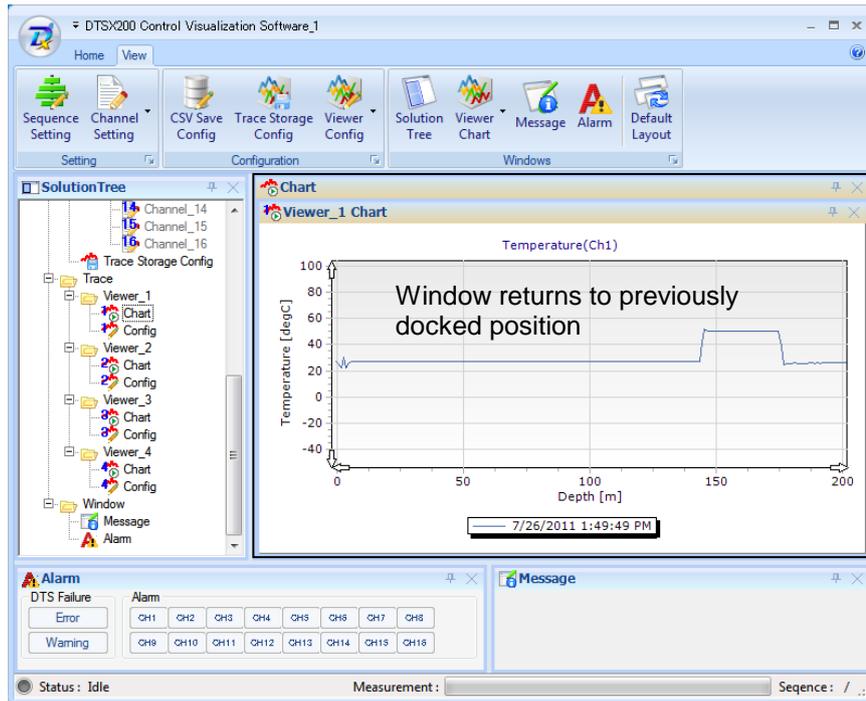
Drop where the mouse pointer is not over a **docking icon**.

Double-click



- **Returning a floating window to its previously docked position**
To return a floating window to its previously docked position, double-click its title bar.





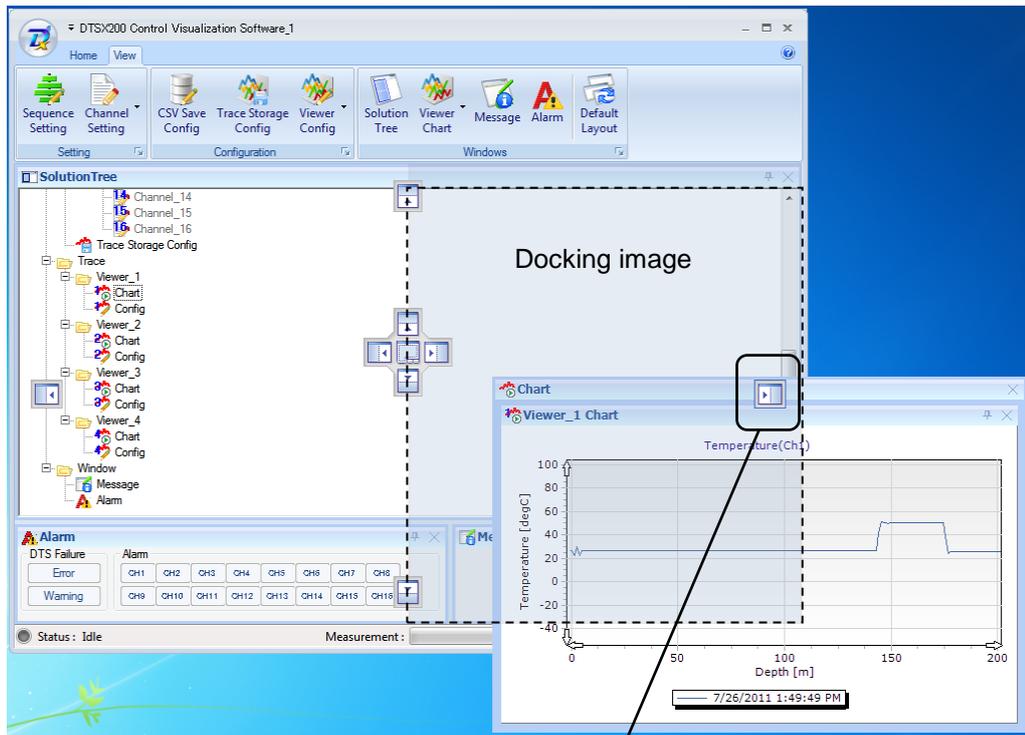
● **Docking a window to any edge of the main window**

A window can be docked to any one of the four edges of a window other than the main window using the following procedure:

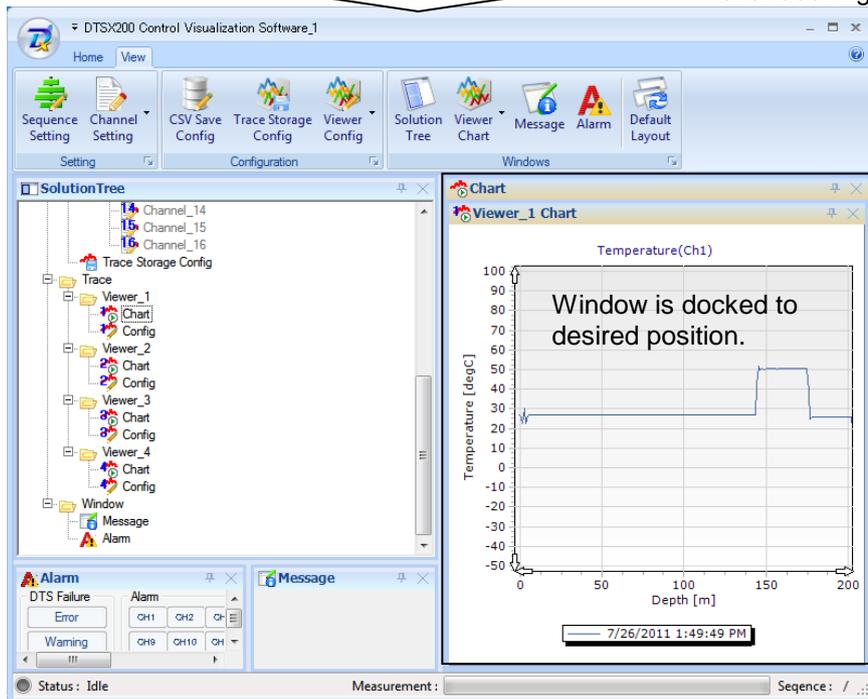
1. Drag the title bar of the window to be docked. (Docking icons appear when the title bar is dragged over the display area of another window.)
2. Drag, move the mouse pointer over the desired docking icon displayed on an outer edge, and drop. (An outline of the window (docking image) appears when the mouse pointer is over a docking icon.)

TIP

- A Viewer_1-4 Chart window can be docked within a Chart window.
- If a window to be docked is the only displayed window, dropping it over any docking icon (except the cross center of the inner docking icons) will dock the window fully within the main window.



Drag the mouse pointer over docking icon and drop.



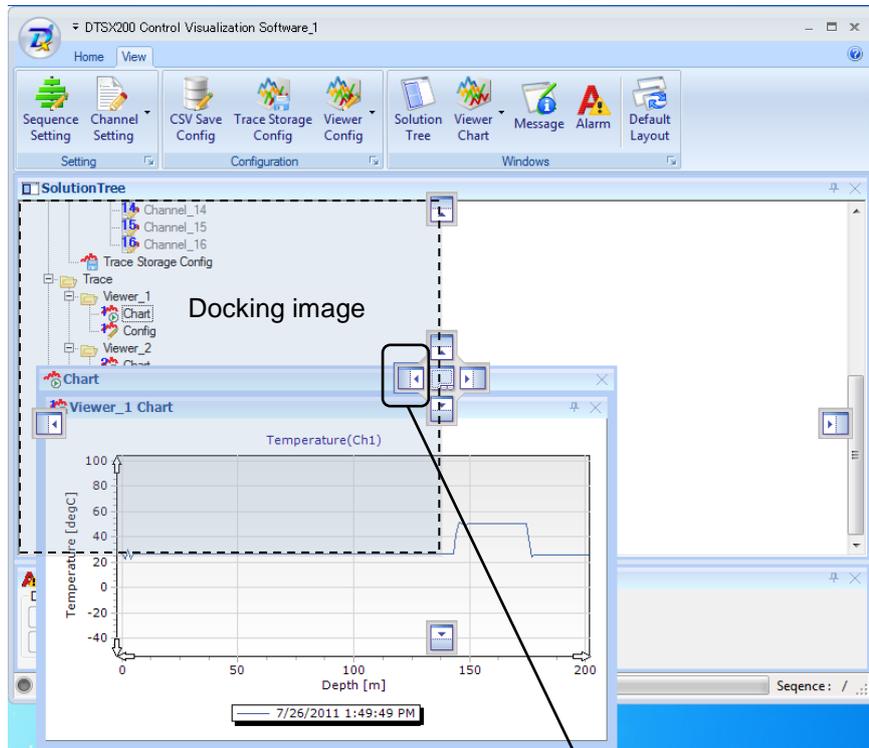
● **Docking a window to any edge of a window other than the main window**

A window can be docked to any one of the four edges of a window other than the main window using the following procedure:

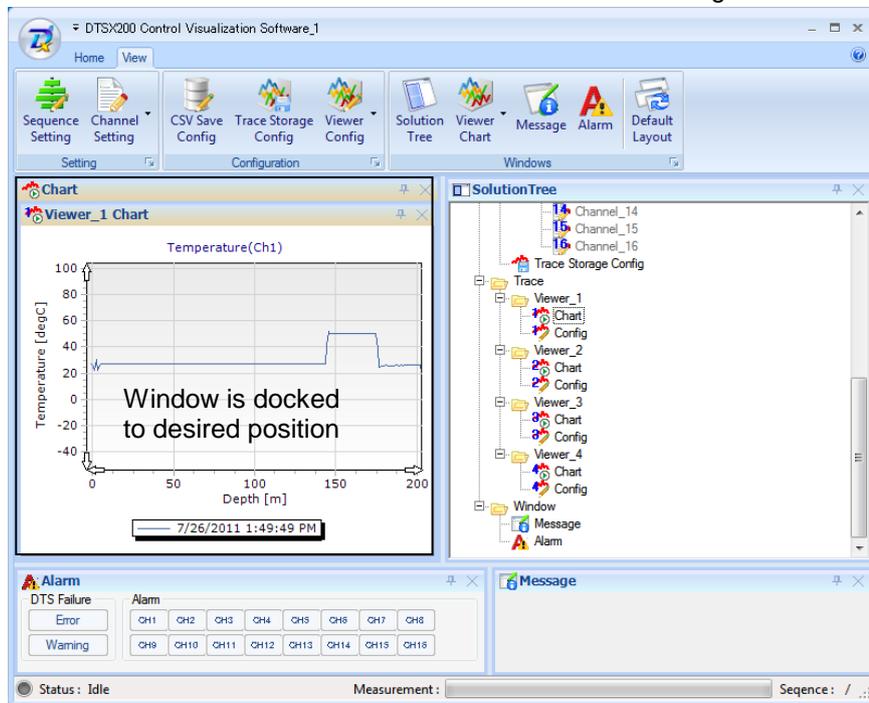
1. Drag the title bar of the window to be docked. (Docking icons appear when the title bar is dragged over another window.)
2. Drag the title bar over the display area of the window where you want to dock it. Move the mouse pointer over the desired docking icon (except the cross center) displayed on an inner edge, and drop the title bar. (An outline of the window (docking image) appears when the mouse pointer is over a docking icon.)

TIP

- A Viewer_1-4 Chart window can be docked to another Viewer_1-4 Chart window.
- A window can also be docked to a floating window. When a window to be docked is dragged over the display area of a floating window, only the docking icons arranged as a cross appear.



Drag the mouse pointer over docking icon and drop.



● **Tab-docking a window (creating a set of tabbed windows)**

A window can be tab-docked to another window, other than the main window. There are two ways to do this.

Method 1: Using the docking icon (See detailed procedure below.)

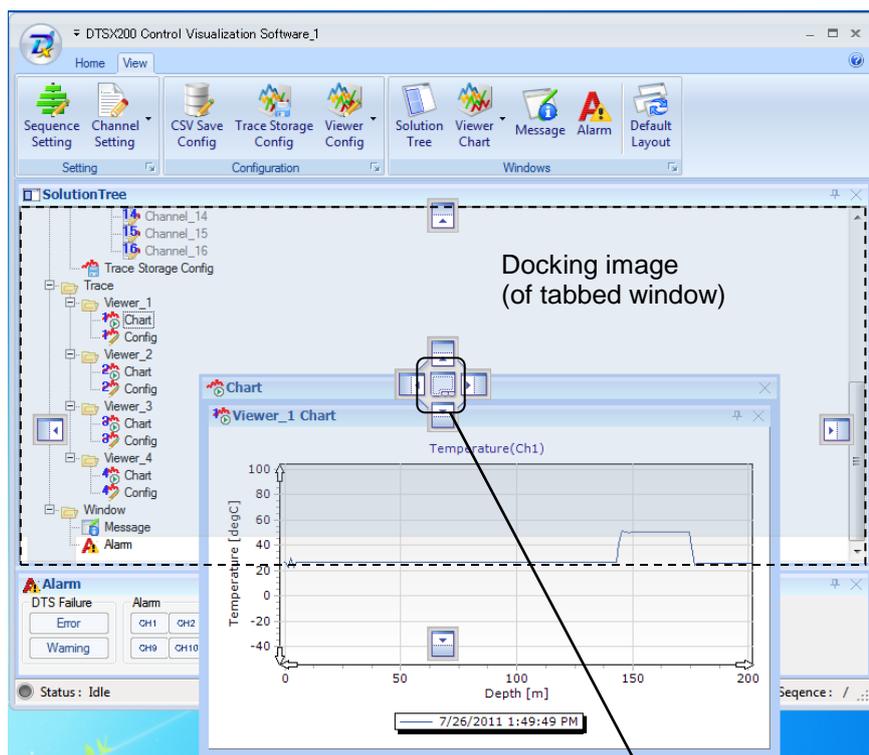
1. Drag the title bar of the window to be tab-docked. (Docking icons appear when the title bar is dragged over the display area of another window.)
2. Drag the title bar over the display area of the window where you want to dock it. Move the mouse pointer over the cross center of the inner docking icons, and release the mouse button. (An outline of the window (docking image) appears when the mouse pointer is over a docking icon.)

Method 2: Drag and drop window title bar onto the title bar of the destination window (See detailed procedure below.)

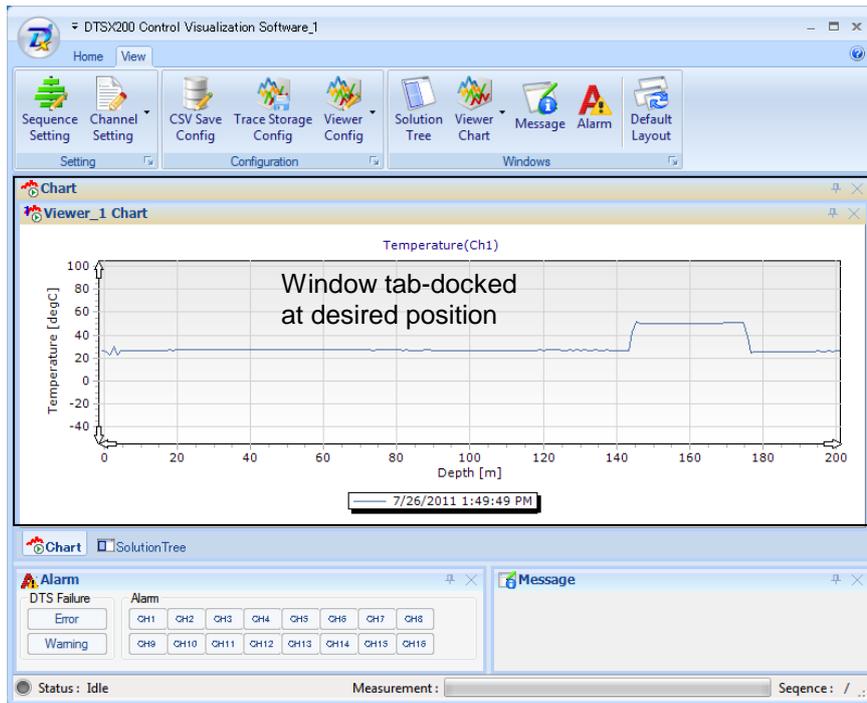
1. Drag the window title of the window to be tab-docked.
2. Move the mouse pointer over the title bar of another window and release the mouse button. (An outline of the window (docking image) appears when the mouse pointer is over the title bar.)

TIP

- A Viewer_1-4 Chart window can be tab-docked to another Viewer_1-4 Chart window.
- If no other window is displayed, moving the mouse pointer over the cross center of the inner docking icons floats the window.

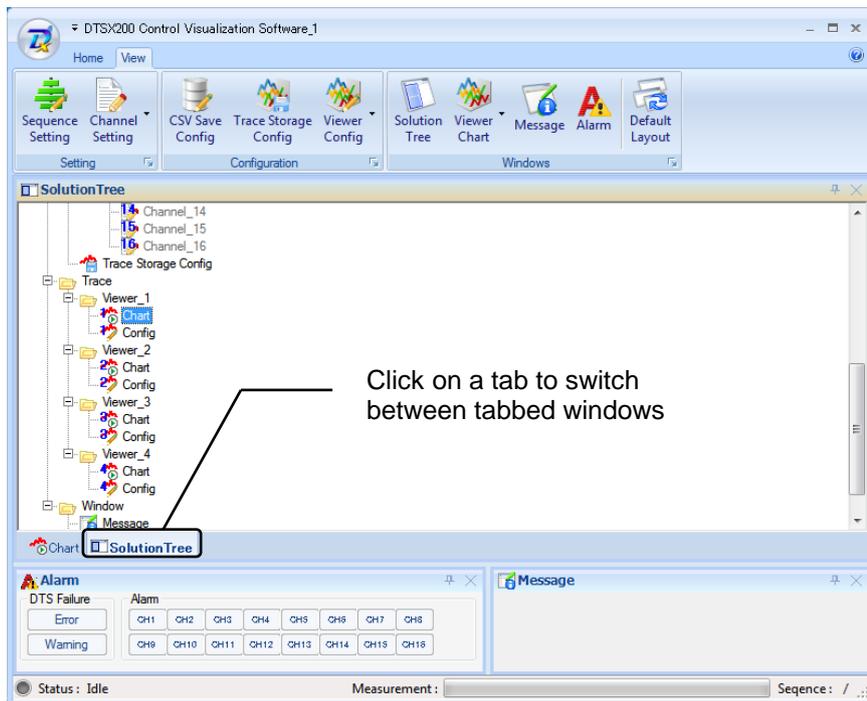


Drag the title bar over docking icon and drop it.



- **Switching display between tabbed windows**

Clicking a tab at the bottom of a tabbed group switches the window display to the selected tabbed window.



- **Separating a tabbed window**

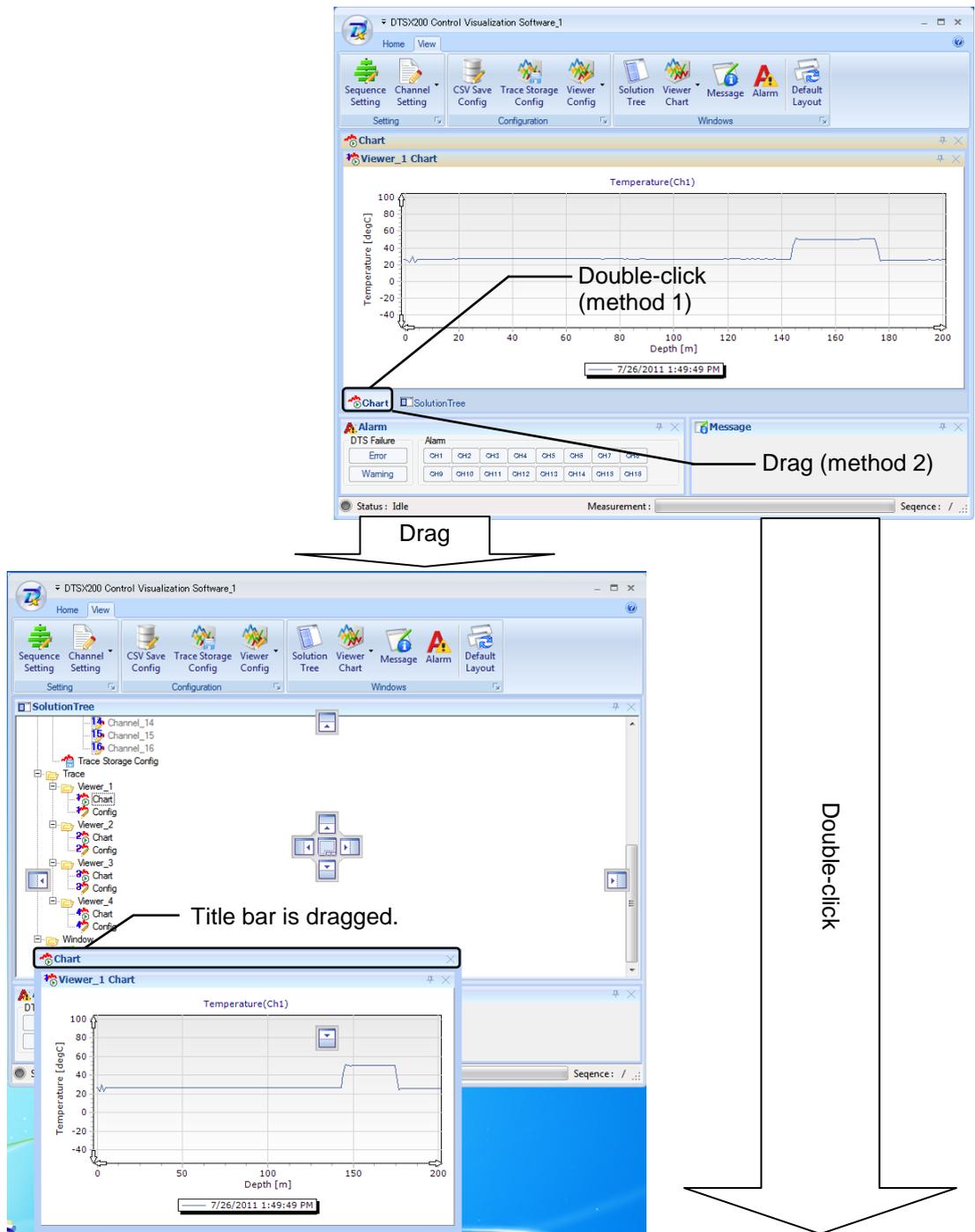
A superimposed window can be separated using any of the following two methods:

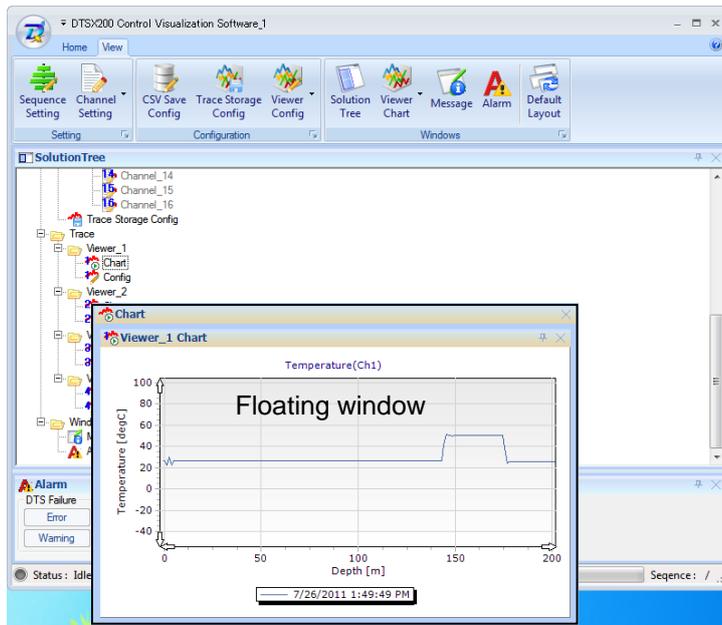
Method 1: Double-click the tab of the window to be separated. (The separated window becomes a floating window.)

Method 2: Drag and drop the tab of the window to be separated. (Dragging a tab has the same effect of dragging the title bar of that window.)

TIP

- In method 2, the dragged window can be floated or docked in any preferred way as follows:
 - ◇ Float the window (method 2)
 - ◇ Drag the tab to any one of the four edges of the main window
 - ◇ Drag the tab to any one of the four edges of another window





● **Closing a tabbed window**

Clicking the [X] button at the top right corner of a tabbed window closes superimposed windows.

TIP

- If the tabbed window is docked in a main window, only the displayed window is closed.
- If the tabbed window is floating, all windows of the tabbed group are closed.

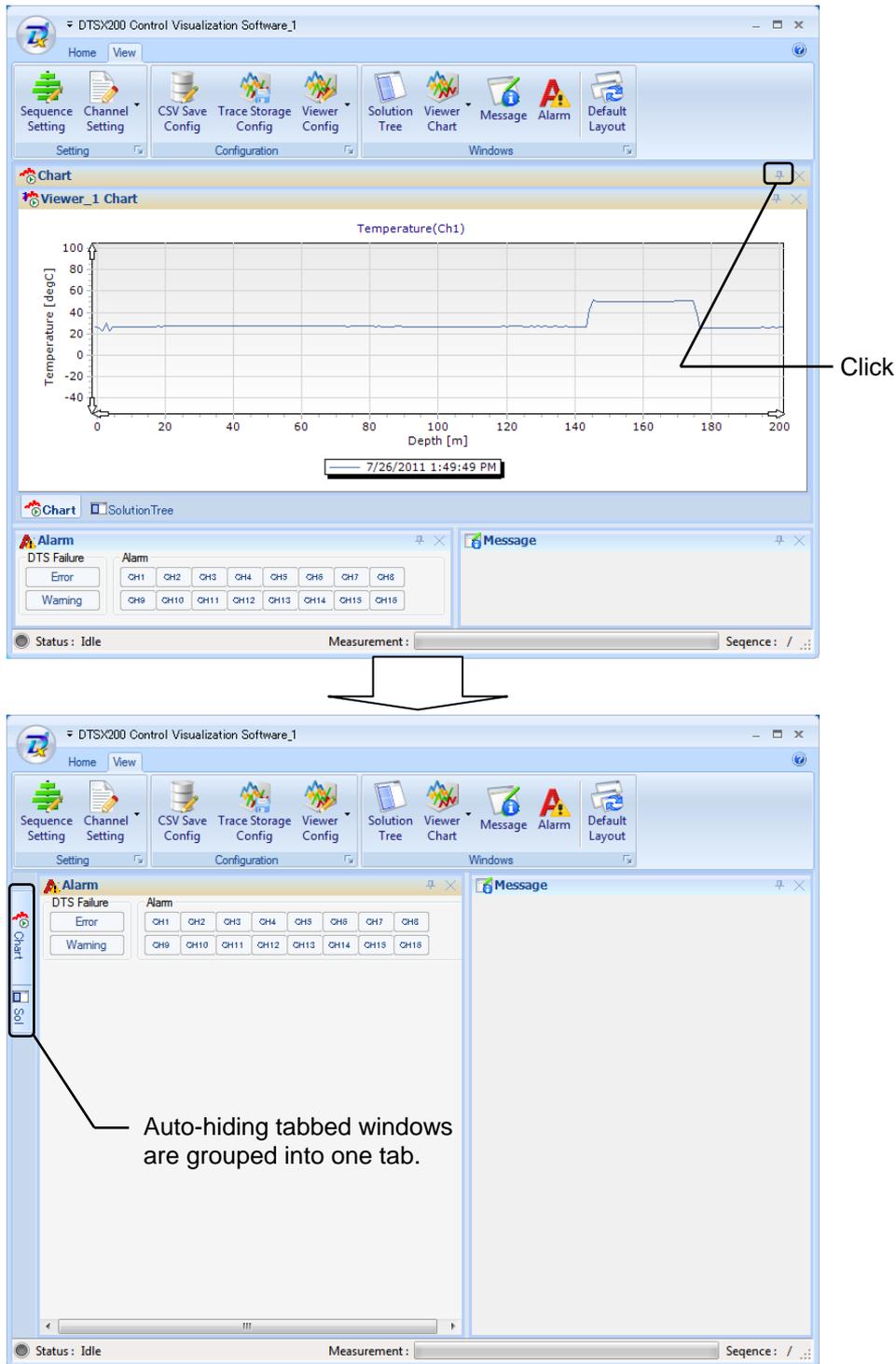
SEE ALSO

For details on the window operation, see the description entitled “Closing a window.”

● **Auto-hiding tabbed windows**

Clicking on the [H] button at the top right corner of the displayed window auto-hides its tabbed windows. Auto-hiding tabbed windows appear as a tab along one of the four edges of the main window. Viewer_1-4 Chart windows, however, are displayed as a tab along one of the four edges of the Chart window.

Auto-hiding tabbed windows are grouped into a single tab, which displays their window titles jointly. The title of the tabbed window that is displayed before auto-hiding appears in full form in the tab while the titles of the other tabbed windows appear abbreviated in the tab.



- **Displaying an auto-hiding tabbed window temporarily**

Hovering the mouse pointer over any window title in a tag displays the auto-hiding window temporarily. Moving the mouse pointer outside the temporarily displayed window auto-hides it again.

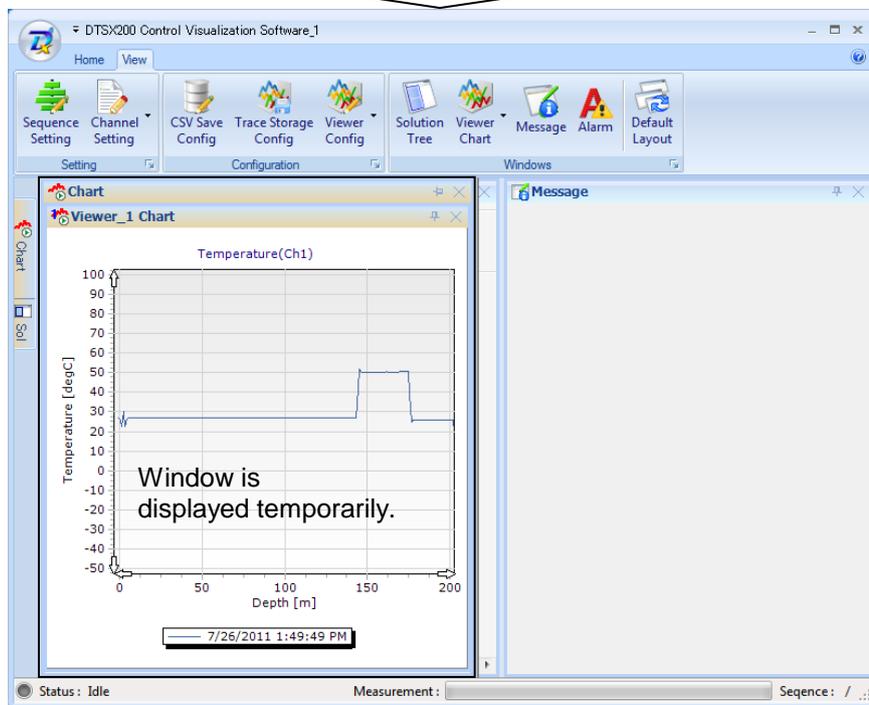
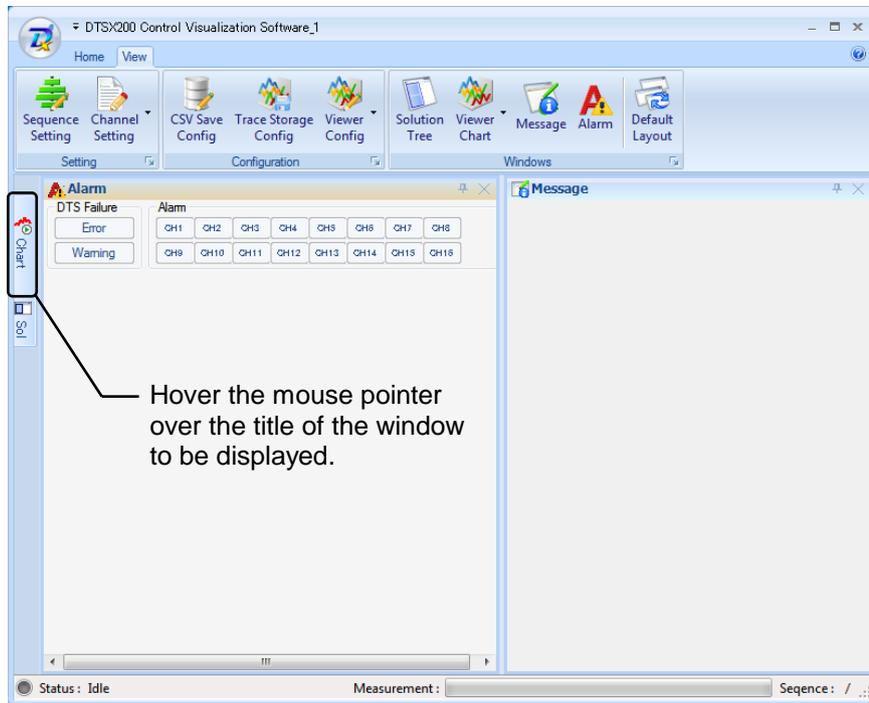
When any auto-hiding window is displayed temporarily, its window title appears in full form in the tab while the titles of the other windows appear truncated.

No tab is displayed at the bottom of the temporarily displayed window. (Switching display between windows is not allowed.)

Clicking on a temporarily displayed window gives it focus. The window remains displayed until the focus is moved elsewhere.

TIP

- Hovering the mouse pointer over a window title in a tab when the application itself is not in focus will not display the auto-hiding window temporarily.



- **Turning off auto-hiding of a tabbed window**

The method is similar to that for a normal non-tabbed window. For details, see the description entitled “● Turning off auto-hiding of a window.”

- **Floating a tabbed window**

The method is similar to that for a normal non-tabbed window. For details, see the description entitled “● Floating a window.”

- **Returning a floating tabbed window to its previously docked position**

The method is similar to that for a normal non-tabbed window. For details, see the description entitled “● Returning a floating window to its previously docked position.”

- **Docking a tabbed window to any edge of the main window**

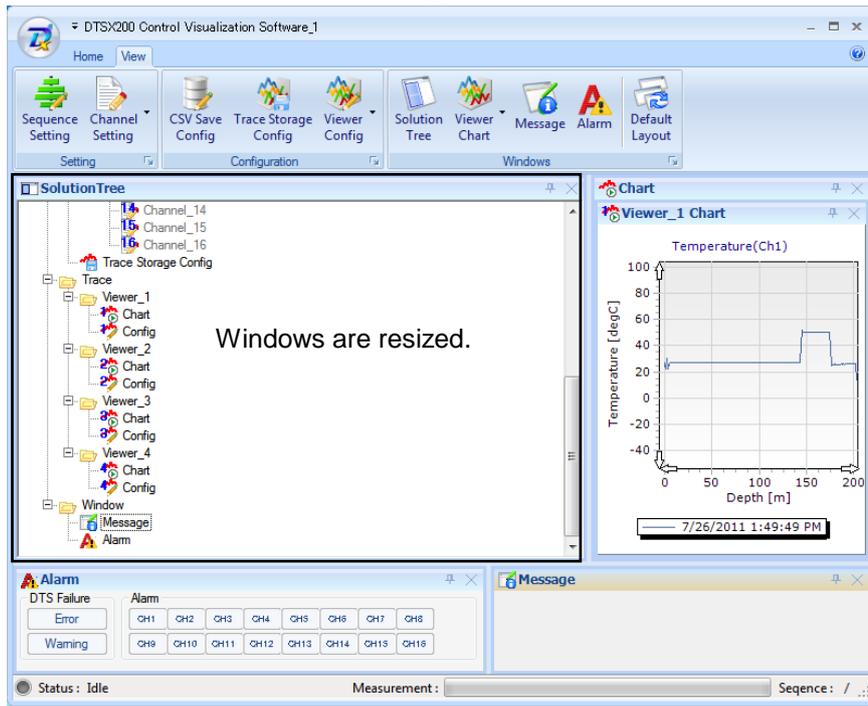
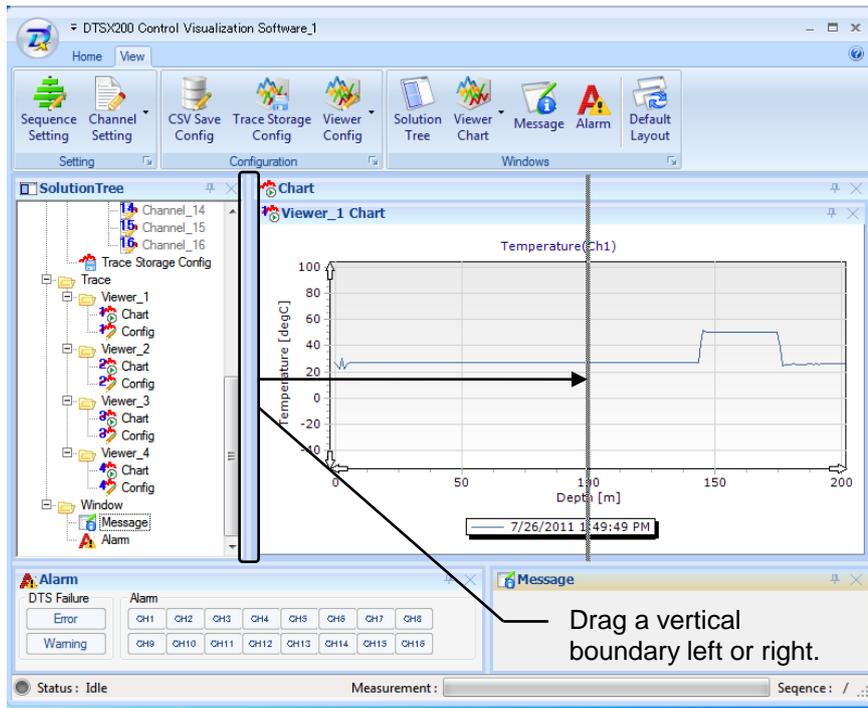
The method is similar to that for a normal non-tabbed window. For details, see the description entitled “● Docking a window to any edge of the main window.”

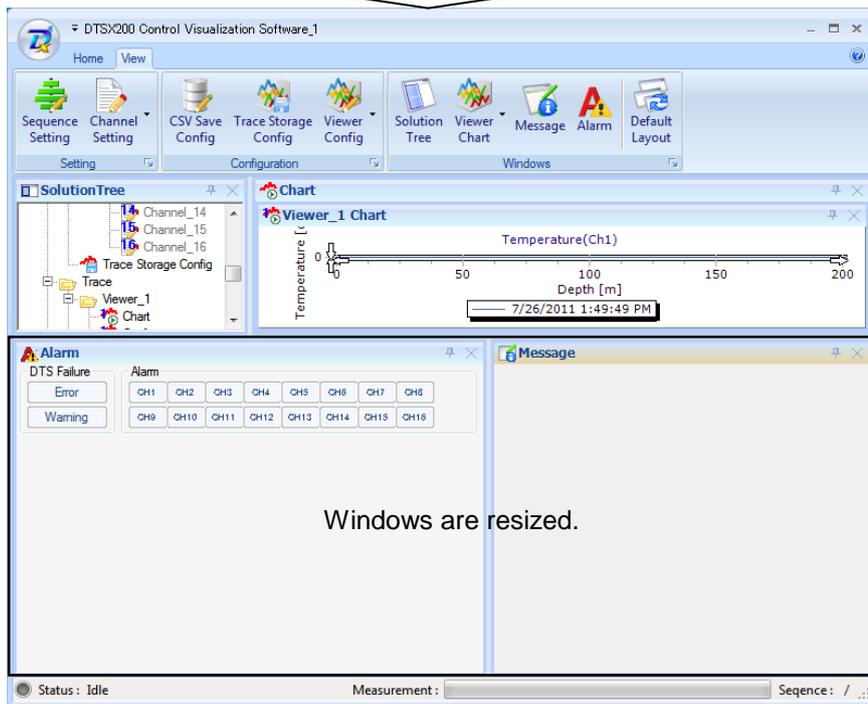
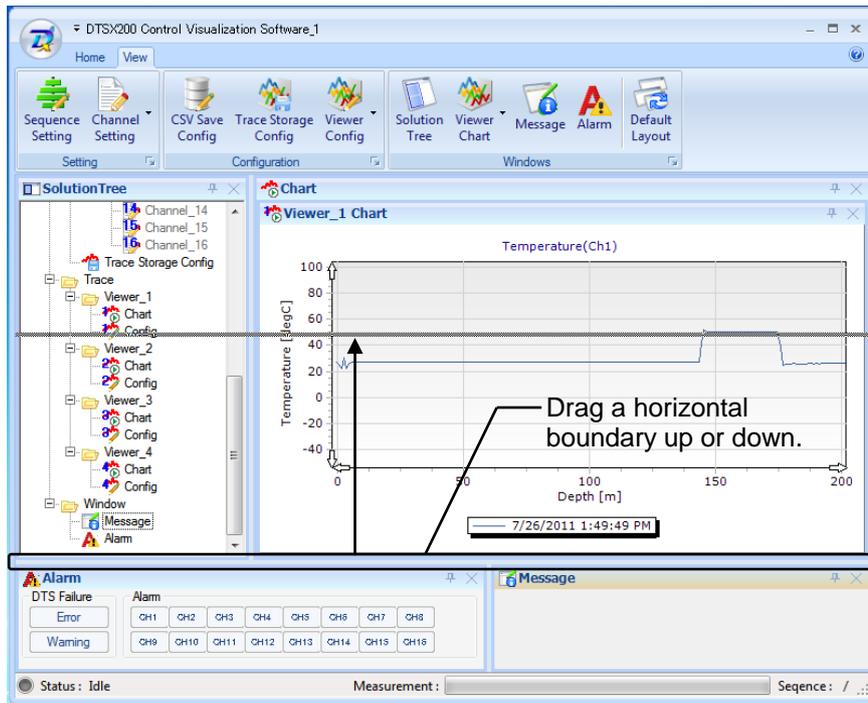
- **Docking a tabbed window to any edge of a window other than the main window**

The method is similar to that for a normal non-tabbed window. For details, see the description entitled “● Docking a window to any edge of a window other than the main window.”

- **Resizing a window**

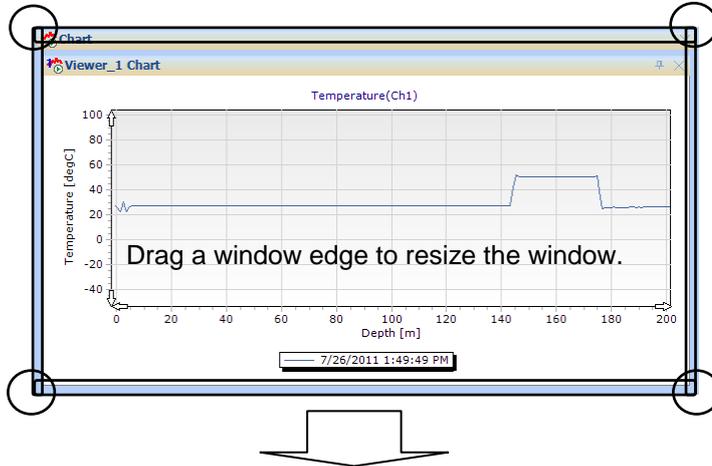
When multiple windows are displayed, the windows can be resized by dragging and dropping the boundary between the windows. A vertical boundary can be dragged left and right while a horizontal boundary can be dragged up and down.





- **Resizing a floating window**

A floating window can be resized by dragging and dropping one of its edges. The left and right edges of a floating window can be dragged left and right while the top and bottom edges of a floating window can be dragged up and down. The corners of a floating window can be dragged diagonally.

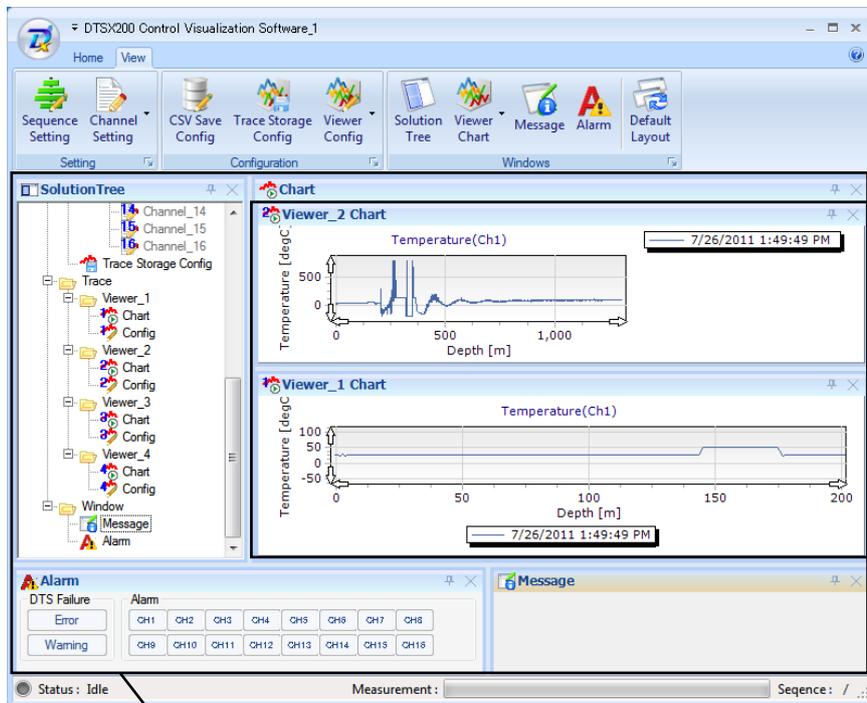
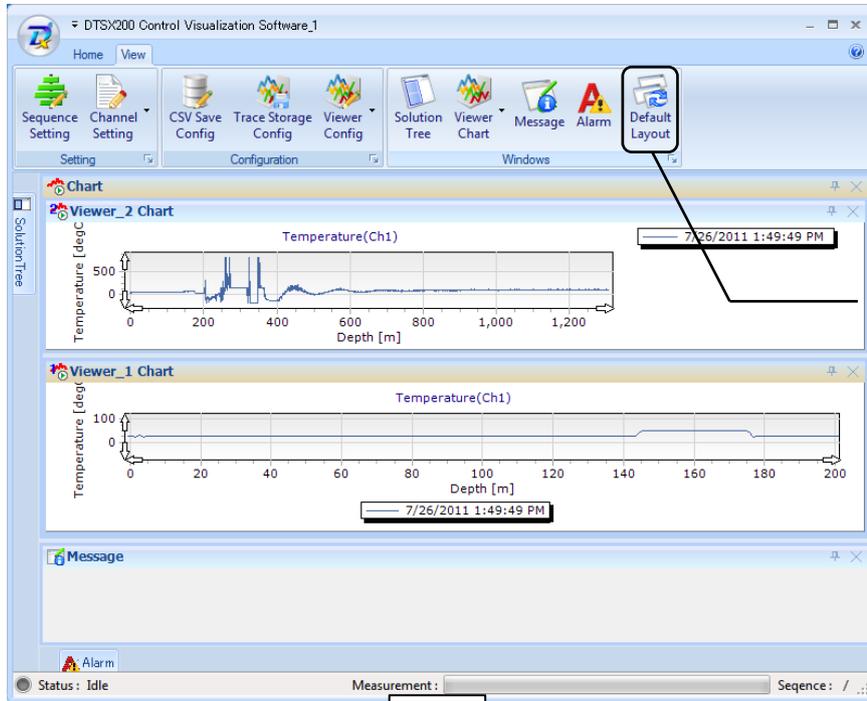


- **Initializing window layout**

Selecting View>Windows>Default Layout in the main window initializes the window layout.

TIP

- The initial window layout refers to the window layout when the application is first started after installation.
- The size of the main window is not initialized.
- The window layout of Viewer_1-4 Chart windows is not initialized.



Layout of all windows other than the Viewer_1-4 Chart windows is initialized.

4.4.4 Menu Items for Displaying Dialogs (in main window)

This subsection describes the displaying of dialogs from the main window menu. The table below lists the menu items (tabs, group boxes, buttons and menus) for displaying dialogs.

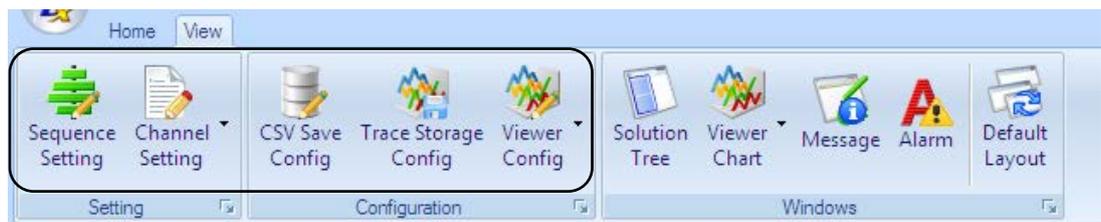
Menu Element (Tab, group box, button or menu)	Description
Home (tab)	
DTS Control (group box)	
Connect (button)	Displays Connect dialog
Wizard(*1) (group box)	
Fiber Connection (button)	Displays Fiber Connection Calibration Wizard dialog
Fiber Parameter (button)	Displays Fiber Parameter Calibration Wizard dialog
View (tab)	
Setting (group box)	
Sequence setting (button)	Displays Sequence Setting dialog
Channel Setting (Drop-down button)	
Channel_1-16 (*2) (menu)	Displays Channel_1-16 dialog
Configuration (group box)	
CSV Save Config (button)	Displays CSV Save Config dialog
Trace Storage Config (button)	Displays Trace Storage Config dialog
Viewer Config (Drop-down button)	
Viewer_1-4 Config (*3) (menu)	Displays Viewer_1-4 Config dialog
Tool (tab)	
Self Test (group box)	
Self Test (button)	Displays Self Test dialog

*1: This item is displayed in calibration mode only.

*2: In online state, menu options are listed for the number of channels installed in the DTSX200.

In offline state, menu options are listed for the number of channels selected in the Select Switch dialog.

*3: Only Viewer_1 is displayed in calibration mode.



The display of the menu varies with the operation mode (Control, Monitor, Calibration or Trace) and the online/offline state as shown in the table below.

Menu Element for Displaying Dialogs (tab, group box, button or menu)	Online			Offline			
	Control	Monitor	Calibration	Control	Monitor	Calibration	Trace
Home (tab)	O	O	O	O	O	O	O
DTS Control (group box)	O	O	O	X	X	X	X
Connect (button)							
Wizard (group box)							
Fiber Connection (button)	X	X	O	X	X	Δ	X
Fiber Parameter (button)							
View (tab)	O	O	O	O	O	O	O
Setting (group box)							
Sequence setting (button)	O	O	O	O	O	O	O
Channel Setting (Drop-down button)							
Channel_1-16 (*1) (button)	O	O	O	O	O	O	O
Configuration (group box)	O	O	O	O	O	O	O
CSV Save Config (button)	X	X	X	X	X	X	O
Trace Storage Config (button)	O	O	O	O	O	O	O
Viewer Config (Drop-down button)							
Viewer_1-4 Config (*2) (menu)	O	O	O	O	O	O	O
Tool (tab)	O	X	O	X	X	X	X
Self Test (group box)	O	X	O	X	X	X	X
Self Test (button)							

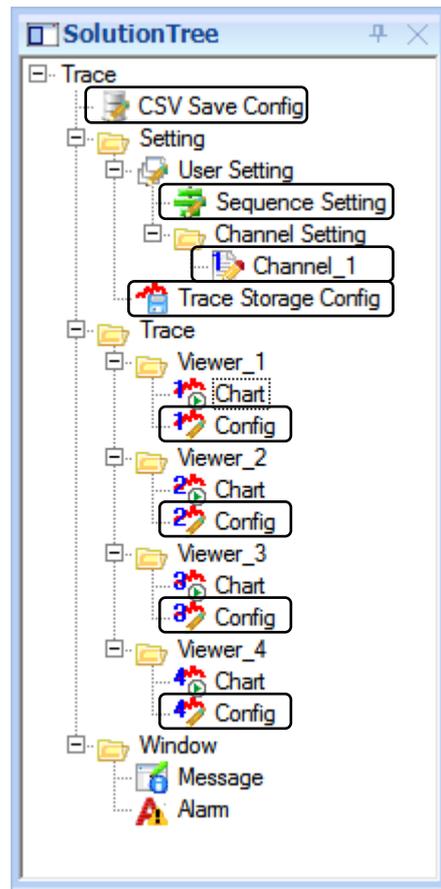
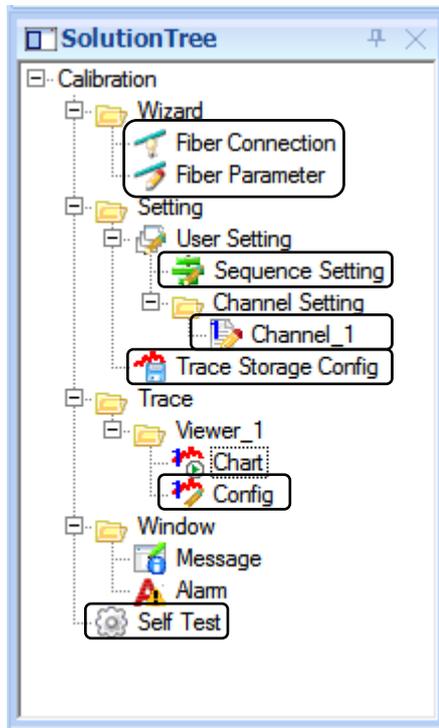
- O Displayed
- Δ Displayed but not selectable
- X Not displayed
- *1: In online state, menu options are displayed for the number of channels installed in the DTSX200. In offline state, menu options are displayed for the number of channels selected in the Select Switch dialog.
- *2: Only Viewer_1 is displayed in calibration mode.

4.4.5 Nodes for Displaying Dialogs (in Solution Tree Window)

This subsection describes the displaying of dialogs from a node in the Solution Tree window. The table below lists the nodes for displaying dialogs.

Nodes for Displaying Dialogs	Description
Control, Monitor, Calibration or Trace	
CSV Save Config	Displays CSV Save Config dialog.
Wizard(*1)	
Fiber Connection	Displays Fiber Connection Calibration Wizard dialog.
Fiber Parameter	Displays Fiber Parameter Calibration Wizard dialog.
Setting	
User Setting	
Sequence Setting	Display and operation of Sequence Setting dialog.
Channel Setting	
Channel_1-16 (*2)	Display and operation of Channel_1-16 dialog.
Trace Storage Config	Display and operation of Trace Storage Config dialog.
Trace	
Viewer_1-4 (*3)	
Config	Display and operation of Viewer_n Config dialog (n matches the parent node).
Self Test	Displays Self Test dialog.

- *1: This item is displayed in calibration mode only.
- *2: In online state, nodes are displayed for the number of channels installed in the DTSX200. In offline state, nodes are displayed for the number of channels selected in the Select Switch dialog.
- *3: Only Viewer_1 is displayed in calibration mode.



The display of the nodes varies with the operation mode (Control, Monitor, Calibration or Trace) and the online/offline state as shown in the table below.

Nodes for Displaying Dialogs	Online			Offline			
	Control	Monitor	Calibration	Control	Monitor	Calibration	Trace
Control, Monitor, Calibration or Trace	Control	Monitor	Calibration	Control	Monitor	Calibration	Trace
CSV Save Config	X	X	X	X	X	X	O
Wizard							
Fiber Connection	X	X	O	X	X	Δ	X
Fiber Parameter							
Setting							
User Setting							
Sequence Setting	O	O	O	O	O	O	O
Channel Setting							
Channel_1-16	O(*1)	O(*1)	O(*1)	O(*2)	O(*2)	O(*2)	O(*2)
Trace Storage Config	O	O	O	O	O	O	O
Trace			O			O	
Viewer_1-4	O	O	O(*3)	O	O	O(*3)	O
Config							
Self Test	O	X	O	X	X	X	X

O Displayed

Δ Displayed but not selectable

X Not displayed

*1: Nodes are displayed for the number of channels installed in the DTSX200.

*2: Nodes are displayed for the no. of channels selected in the Select Switch dialog.

*3: Only Viewer_1 is displayed.

4.4.6 Dialog Operations

This subsection describes basic dialog operations.

A dialog is displayed as a pop-up window. While a dialog is displayed, displaying another window or dialog and working on another displayed window are not allowed.

Dialogs cannot be resized and do not allow complex operations available with normal windows.

TIP

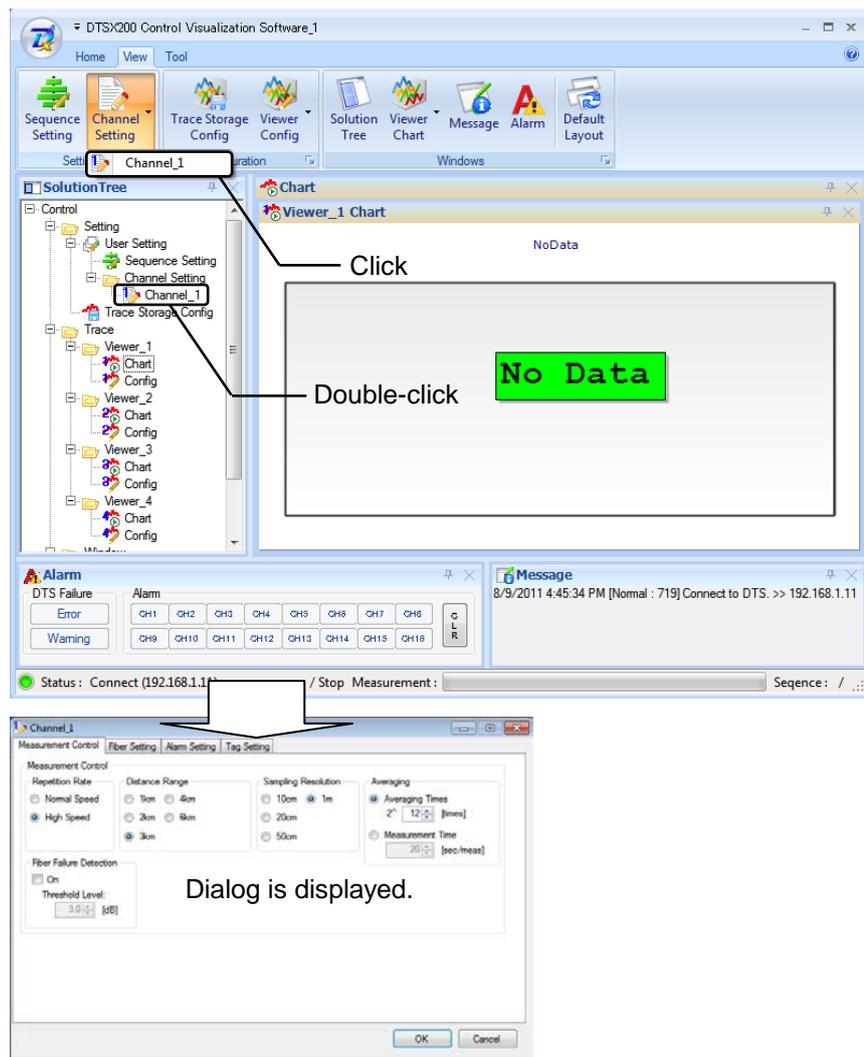
- Other windows or dialogs can be displayed or operated while a calibration-type dialog is displayed. (A calibration dialog can be operated alternately with a View_1 Chart window.)

SEE ALSO

For details, see Chapter 7, "Calibration Mode."

- **Displaying a dialog**

A dialog can be displayed by clicking on its associated button in the main window or double-clicking on its associated node in the Solution Tree window.

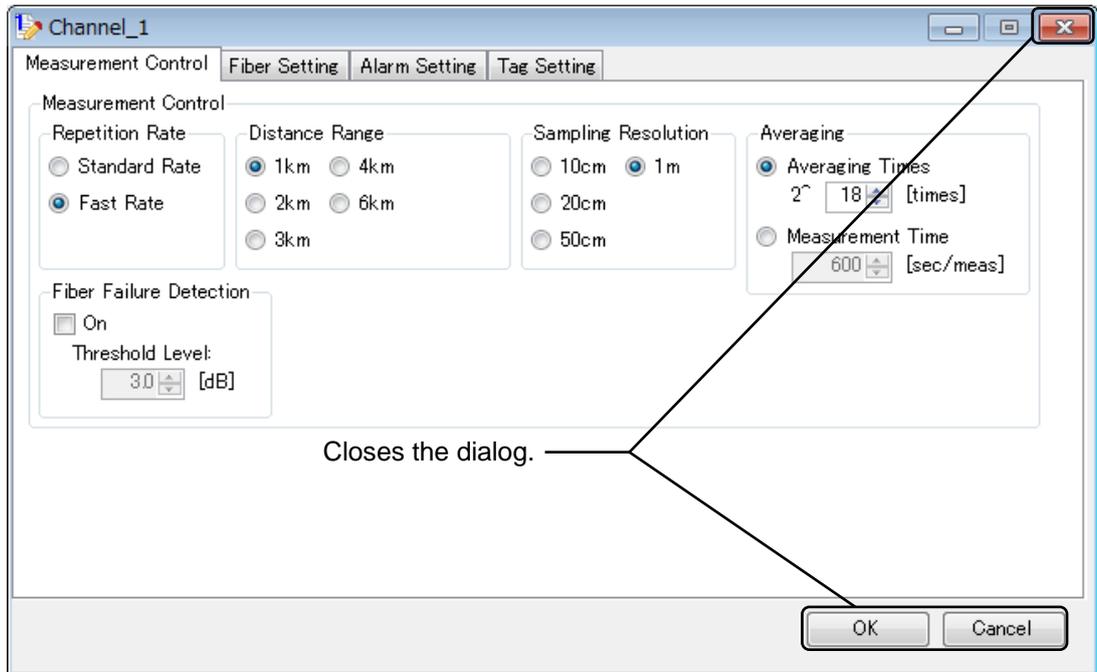


- **Closing a dialog**

Clicking a button at the bottom of a dialog or the [x] button at the top right corner of a dialog closes the dialog.

TIP

- The buttons displayed at the bottom of a dialog vary with the dialog and may include [OK], [Cancel], [Close] and other buttons. For details, see the description of each dialog.



4.5 Starting and Stopping Measurement

You can start, as well as stop measurement by the DTSX200 from the menu of the main window or a context menu in the Solution Tree window.

Starting and stopping measurement is allowed only when the DTSX200 is connected online in control or calibration mode.

Moreover, measurement can be started only when it is not in progress and conversely can be stopped only when it is in progress.

Menu or Context Menu Item	Online State				Offline State
	Control	Monitor	Calibration	Trace	
Start	O(*1)	X	O(*1)	X	X
Stop	O(*2)	X	O(*2)	X	X

O Displayed

X Not displayed

*1: Executable when connected to DTSX200 and measurement is not in progress

*2: Executable when connected to DTSX200 and measurement is in progress

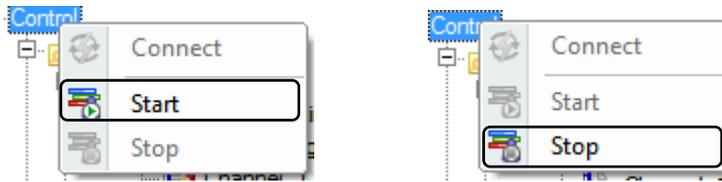
4.5.1 Starting Measurement from Menu (in main window)

This subsection describes how to start and stop measurement by the DTSX200 from the menu in the main window. To start measurement, select Home>DTS Control>Start. To stop measurement, select Home>DTS Control>Stop.



4.5.2 Starting Measurement from Context Menu (in Solution Tree window)

This subsection describes how to start and stop measurement by the DTSX200 from a context menu in the Solution Tree window.



- **Procedure for starting measurement in control mode**

You can start measurement in control mode using the following procedure provided the DTSX200 is connected online:

1. Right-click on the Control node.
2. Select Start from the displayed context menu.

- **Procedure for stopping measurement in control mode**

You can stop measurement in control mode using the following procedure provided the DTSX200 is connected online:

1. Right-click on the Control node.
2. Select Stop from the displayed context menu.

- **Procedure for starting measurement in calibration mode**

You can start measurement in calibration mode using the following procedure provided the DTSX200 is connected online:

1. Right-click on the Calibration node.
2. Select Start from the displayed context menu.

- **Procedure for stopping measurement in calibration mode**

You can stop measurement in calibration mode using the following procedure provided the DTSX200 is connected online:

1. Right-click on the Calibration node.
2. Select Stop from the displayed context menu.

4.6 Status Display

The status bar is displayed at the bottom of the main window. It displays the following status information.

- DTSX200 error status
- DTSX200 connection status
- DTSX200 measurement status
- DTSX200 measurement progress status



4.6.1 DTSX200 Error Status

A lamp is displayed at the leftmost end of the status bar. This lamp is lit in red if an error is detected on the DTSX200. Detailed error information can be checked on the maintenance screen of the DTSX200.

The table below lists each color of the lamp along with its description.

Lamp color	Status
Grey	DTSX200 is not connected.
Green	No DTSX200 connection error
Red	DTSX200 connection error



4.6.2 DTSX200 Connection Status

The status of the connection to the DTSX200 is displayed to the immediate right of the DTSX200 error status lamp in the status bar.

The table below lists each connection status display value with its description.

Displayed connection status	Status description
Connect (IP address)	Connected to DTSX200 at the displayed IP address
Connecting ...	Requesting for connection
Retry connection	Retrying to connect
Idle	Not connected



4.6.3 DTSX200 Measurement Status

The DTSX200 measurement status is displayed to the immediate right of the DTSX200 connection status in the status bar.

The table below lists each measurement status display value with its description.

Measurement status display	Status description
Run	Measurement is in progress
Run preparation	Preparing for measurement
Stop	Measurement is not in progress
Stop preparation	Preparing to stop measurement
Unknown	Unknown state



4.6.4 DTSX200 Measurement Progress Status

The DTSX200 measurement status is displayed at the rightmost end of the status bar as two substatuses:

- Channel measurement progress status
- Sequence measurement progress status

- **Channel measurement progress status**

The channel measurement progress status is displayed graphically as a progress bar, which grows as measurement progresses to completion. The channel number is displayed to the left of the progress bar.



- **Sequence measurement progress status**

The sequence measurement progress status is displayed graphically as a progress bar. In an example where a measurement sequence specifies measurement of channel 1 followed by channel 2, the progress bar indicates 50% completion at the end of channel 1 measurement and 100% completion at the end of channel 2 measurement.

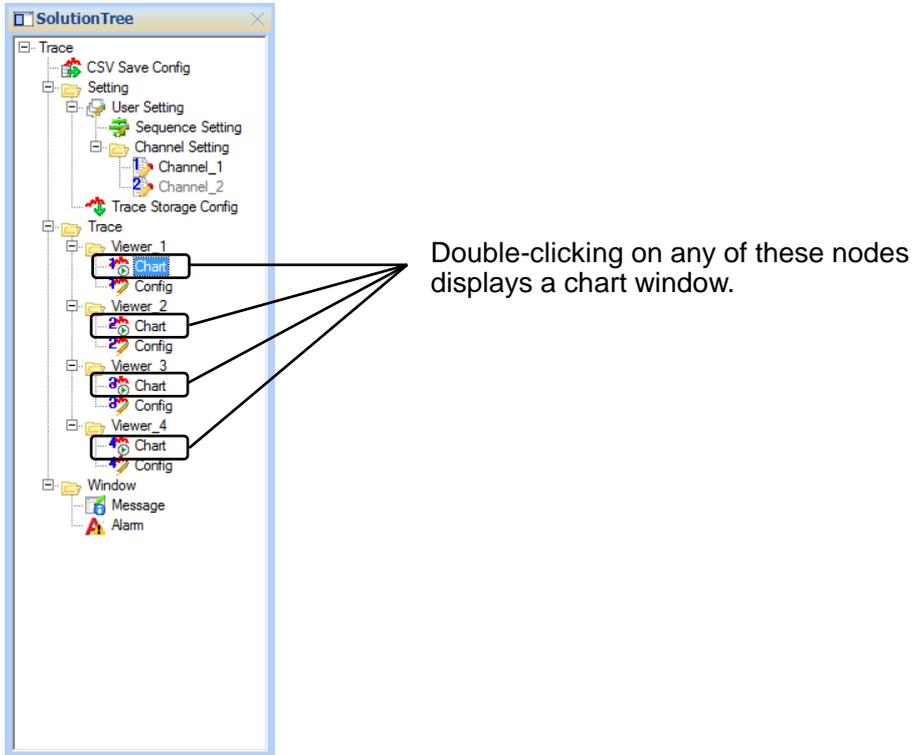
For details on measurement sequence, see Chapter 5, “Control Mode.”



4.7 Chart Display

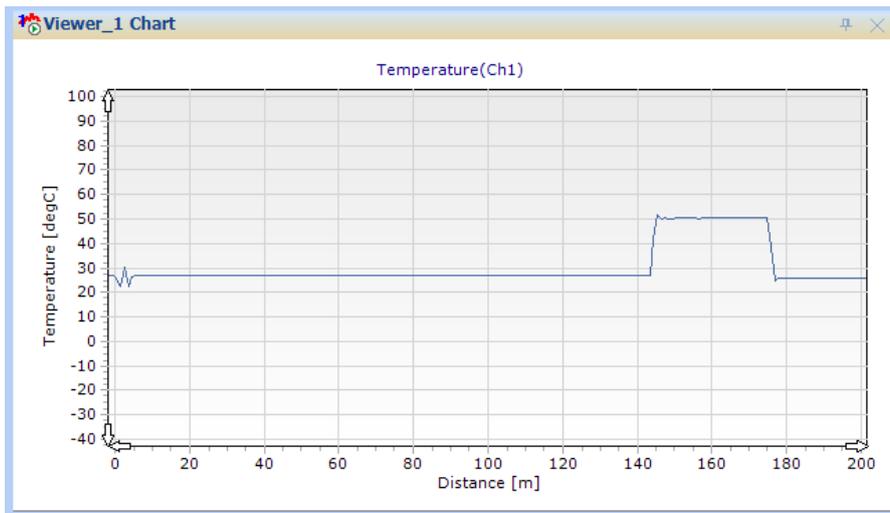
4.7.1 Displaying a Chart

Temperature measurement data of the DTSX200 can be displayed in a chart. No chart is displayed when the software application is started.

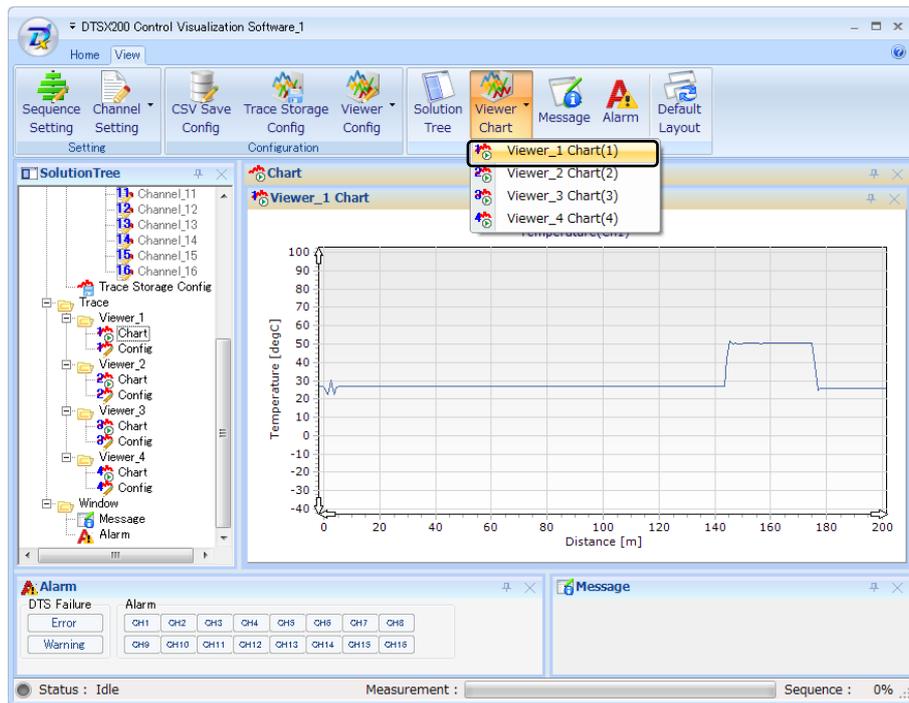


Double-clicking on Solution Tree>Trace>Trace>Viewer_1>Chart displays the Viewer_1 Chart window shown in the figure below.

Up to four chart viewer windows, named Vewer_1 to Viewer_4, can be displayed.

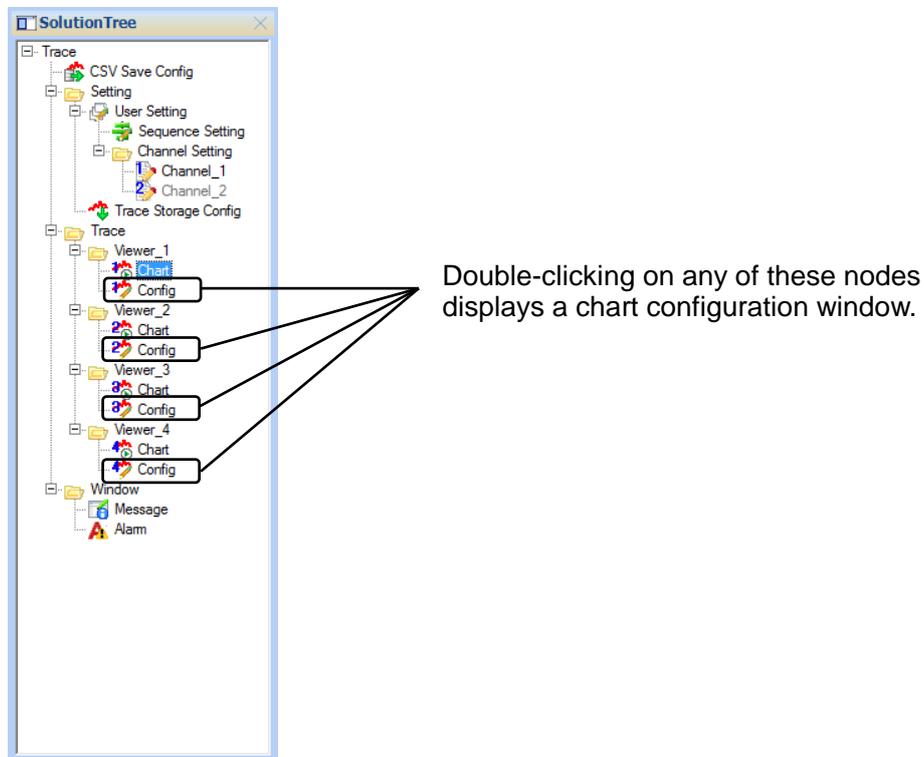


The same chart viewer window can also be displayed by selecting View>Viewer Chart>Viewer_1 Chart from the menu bar.



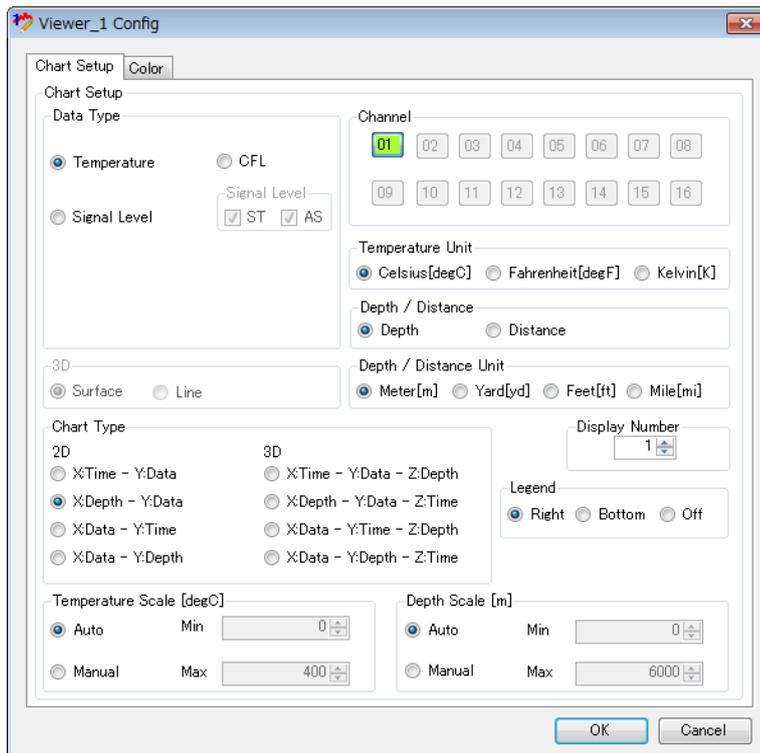
4.7.2 Displaying a Chart Configuration Window

The Chart Configuration Window is used to configure a chart viewer.

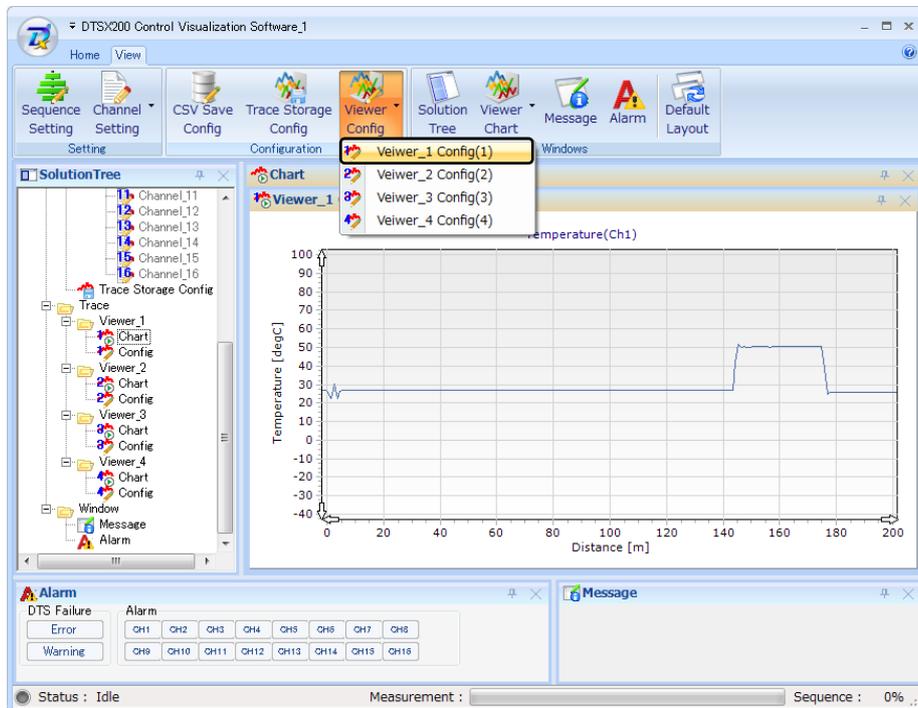


Double-clicking on Solution Tree>Trace>Trace>Viewer_1>Config displays the Viewer_1 Config window shown in the figure below.

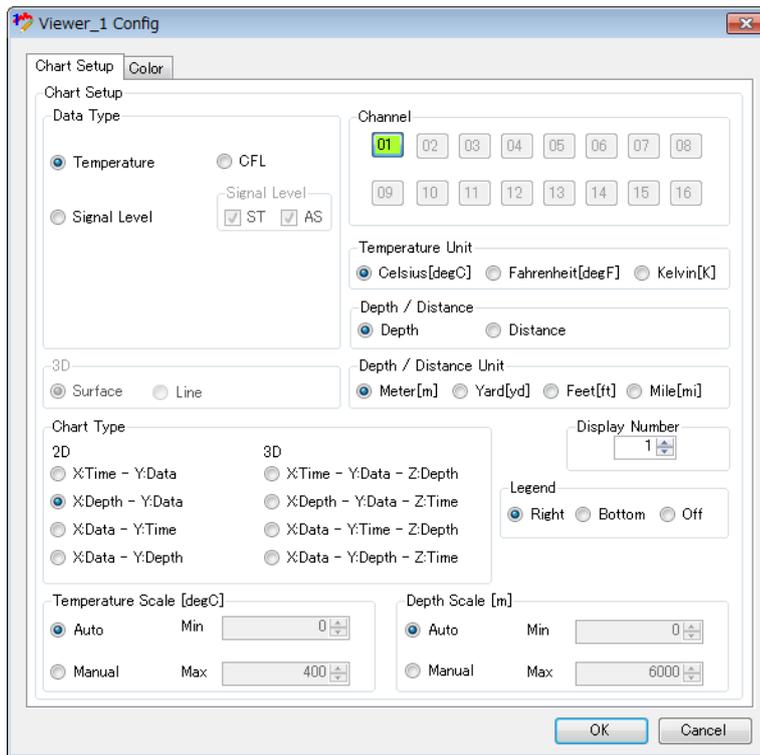
The four chart configuration windows, namely, Vewer_1 Chart to Viewer_4 Chart, correspond one-to-one to the four chart viewer windows (Viewer_1 Chart to Viewer_4 Chart).



The same chart configuration window can also be displayed by selecting View>Viewer Config>Viewer_1 Config from the menu bar.



4.7.3 Configuring Chart Display



You can configure a chart display by selecting the Chart Setup tab in a chart configuration window.

(1) Data Type

Select the type of data to be displayed.

Temperature: displays temperature data

Signal Level: displays signal levels

ST: displays Stokes signal levels.

AS: displays anti-Stokes signal levels.

CFL: displays loss (Calculated Fiber Loss) values.

TIP

The DTSX200 calculates temperature data from measured signal levels.

The CFL waveform is obtained by eliminating the effect of temperature from Stokes signal levels. As the correction value for the fiber loss for Stokes light is fixed at 1.2 dB/km, the CFL slopes downwards when fiber loss is significantly large, indicating a deteriorated optical fiber. However, the CFL result is only meaningful in single-ended measurement and does not indicate fiber loss in double-ended measurement where the measurement results of the forward and reverse directions are combined. Moreover, beware that the CFL is useful only as reference data but not for quantitative assessment of fiber loss.

(2) Channel

Select the channel for chart display.
You can select a channel being measured.

(3) Temperature Unit

Select the unit for temperature data.
Available options are Celsius [degC], Fahrenheit [degF] and Kelvin [K].

(4) Depth / Distance

Select the distance type.
Depth: Depth, which starts from the well inlet position as 0 m and takes into consideration winding coefficient, is used as distance.
Distance: Distance starting from the DTSX200 exit position as 0 m is used.

(5) Depth / Distance Unit

Select the unit for depth or distance.
Available options are Meter [m], Yard [yd], Feet [ft] and Mile [mi].

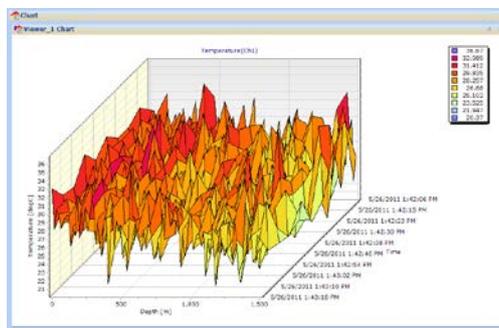
(6) 3D

Surface: Displays a 3D chart as a surface chart.
Line: Displays a 3D chart as a line chart.

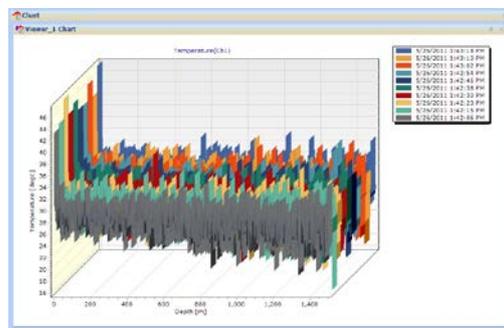
TIP

- Difference between Surface and Line Charts

In a surface chart, adjacent data points along the X-axis and Z-axis are joined by planes. In a line chart, adjacent data points along the X-axis are joined by a line. The figure below shows the surface chart and line chart for the same sample data.



Surface chart



Line chart

(7) Chart Type

Select the chart type.

- 2D

Type	Horizontal Axis (X)	Vertical Axis (Y)
X:Time - Y:Data	Time	Data (temperature or signal level or CFL)
X:Depth(Distance) - Y:Data	Distance	Data (temperature or signal level or CFL)
X:Data - Y:Time	Data (temperature or signal level or CFL)	Time
X:Data - Y:Depth(Distance)	Data (temperature or signal level or CFL)	Distance

- 3D

Type	Horizontal axis (X)	Vertical axis (Y)	Depth axis (Z)
X:Time - Y:Data - Z:Depth (Distance)	Time	Data (temperature or signal level or CFL)	Distance
X:Depth(Distance) - Y:Data - Z:Time	Distance	Data (temperature or signal level or CFL)	Time
X:Data - Y:Time - Z:Depth(Distance)	Data (temperature or signal level or CFL)	Time	Distance
X:Data - Y:Depth(Distance) - Z:Time	Data (temperature or signal level or CFL)	Distance	Time

Note

X:Time - Y:Data, X:Data - Y:Time, X:Time - Y:Data - Z:Depth and X:Data - Y:Time - Z:Depth cannot be selected if the selected channel has not been configured by selecting Trace Storage Config>Time Series Storage Config. For details, see Section 5.6, "Time Series Measurement."

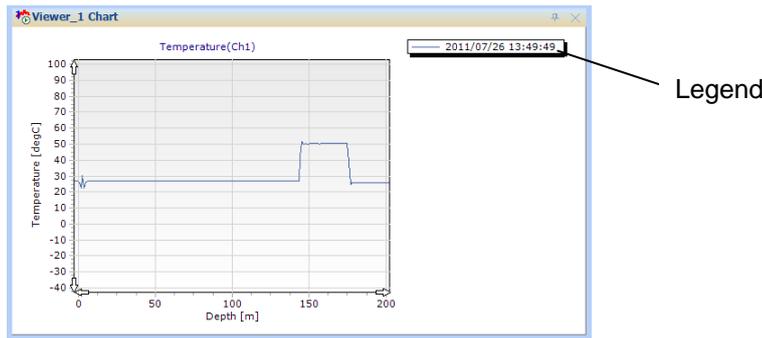
(8) Display Number (available only in Trace mode)

Specify the number of charts to be displayed from 1 to 32. If there are fewer loaded temperature data files than the specified display number, this setting is ignored and charts are displayed for the number of loaded temperature data files.

TIP

If a display number increases, the processing speed of application will become slow.

(9) Legend



Specify how a legend (chart colors and data acquisition time) is to be displayed.

Right: Displayed to the right of the chart.

Bottom: Displayed below the chart.

Off: Not displayed.

(10) Temperature Scale

Select the temperature scale as Auto or Manual. If you have selected Manual, specify the minimum and maximum values of the scale.

The valid data range depends on the temperature unit setting as shown in the table below.

Temperature Unit	Maximum value	Minimum value	Setting resolution
Celsius[degC]	1000	-1000	1
Fahrenheit[degF]	2000	-2000	1
Kelvin[K]	1300	-1300	1

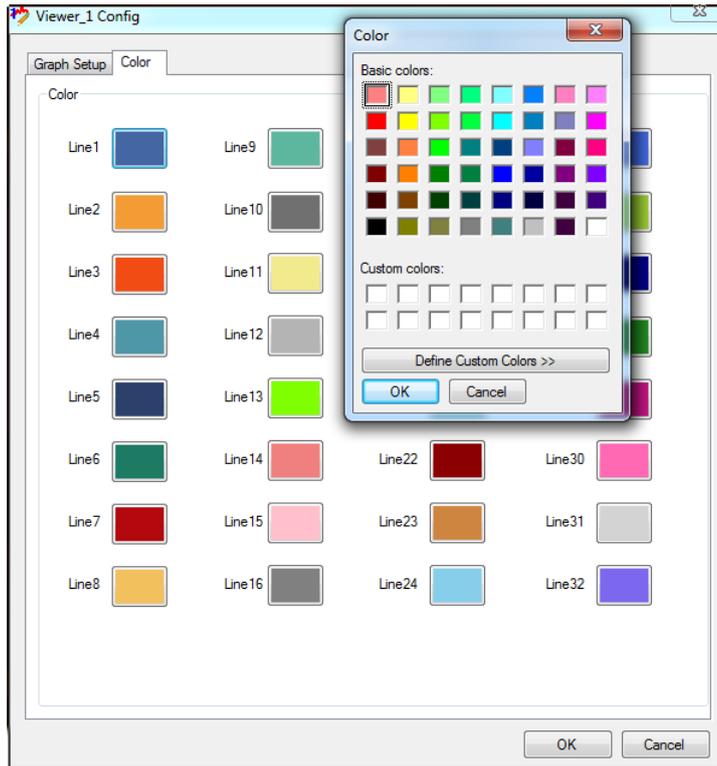
(11) Depth(Distance) Scale

Select the depth (distance) scale as Auto or Manual. If you have selected Manual, specify the minimum and maximum values of the scale.

The valid data range depends on the Depth / Distance Unit setting as shown in the table below.

Depth/Distance Unit	Maximum value	Minimum value	Setting resolution
Meter[m]	10000	-10000	1
Yard[yd]	11000	-11000	1
Feet[ft]	32000	-32000	1
Mile[mi]	6.000	-6.000	0.001

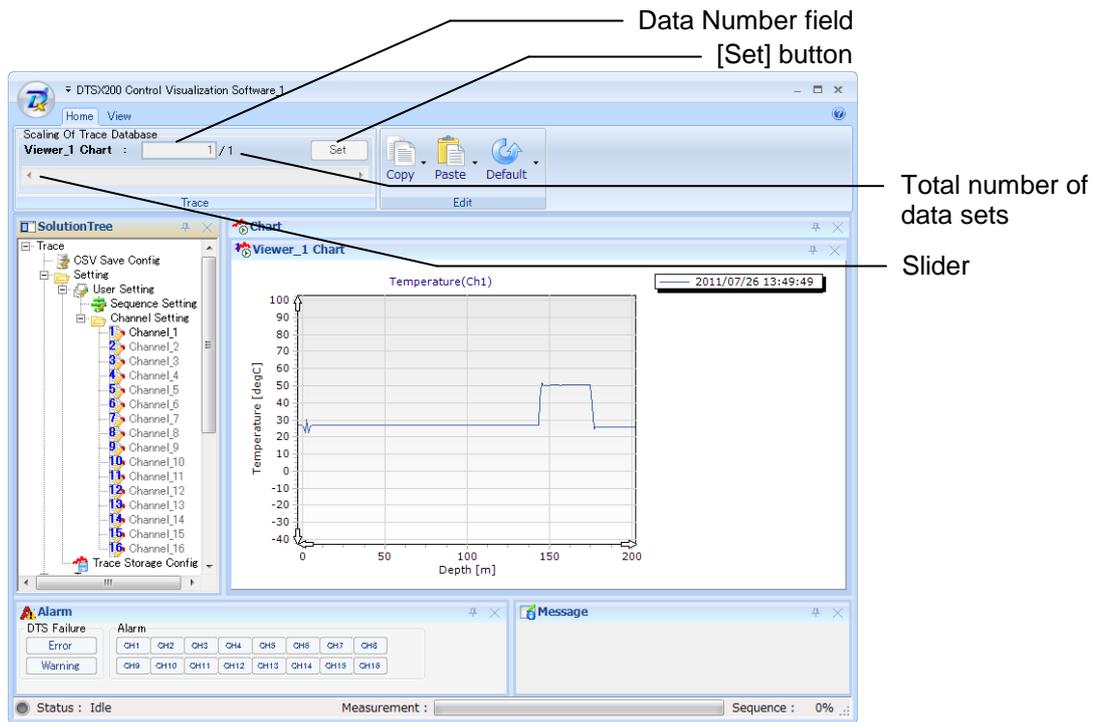
4.7.4 Specifying Chart Colors



You can specify colors for chart lines by selecting the Color tab in the Chart Configuration window.

Clicking on the colored rectangle to the right of any of the 32 chart lines (Line1-32) displays a Color dialog for color selection.

4.7.5 Specifying the Data Display Range (available only in Trace mode)



You can specify the starting data number for chart display by selecting View>Scaling of trace database from the menu.

Data number begins with 1 denoting the most recent data and increments by 1 for successively older data.

You may specify a starting data number either by entering a value in the Data Number field or by moving the slider. When you press the [Set] button, the chart display is updated to display data starting from the specified data number.

TIP

The total number of data sets is the number of available measurement data sets for the channel specified on the Chart Setup tab (see Subsection 4.7.3).

4.7.6 Chart Display Functions

You can execute various display functions in a Chart Viewer window either directly using mouse operations or by right-clicking the mouse button in the window and selecting a function from the displayed context menu. The executable functions differ in 2D and 3D display. The tables below list and describe these functions.

(1) Mouse operations

Function	2D	3D	Description
Zoom	O	X	You can enlarge or reduce the display by dragging the mouse. Drag the mouse from the upper left to the lower right to zoom in and drag the mouse from the lower left to the upper right to zoom out. You can also zoom out by selecting Zoom Out from the context menu.
Pan	O	X	Clicking on an arrow displayed at the end of a scale in a Chart Viewer window moves the scale and the display in the direction of the arrow.

(2) Context menu operations

Function	2D	3D	Description
Copy	O	O	Copies the chart display to the clipboard.
Save	O	O	Saves the chart display to a file in BMP, JPG, WMF, EMF, GIF, PNG or TIFF format.
Print	O	O	Prints the chart display in fixed A4 size and landscape orientation.
Print Preview	O	O	Prints a preview of the chart display. You can modify the print size, color and other properties before printing.
Transparency	O	O	Sets the transparency of waveform display to 50% (The default is 0%).
Guide Line	O	X	Displays guidelines (a horizontal line and a vertical line), which track the mouse pointer.
Display Value	O	X	Displays mouse pointer position values.
Zoom Out	O	X	Undoes the last zoom operation.
Default Scale	O	X	Restores default scale, undoing all zooming.
Scale	X	O	Select the scale factor for the entire chart from 10% to 100% in increments of 10%.
Rotate	X	O	When rotation is enabled, you can change the view point of a chart display by dragging the Chart window.
Z Scale	X	Δ	Shows the scale of the Z-axis (applicable only to surface chart).

(3) Calibration mode specific operations (available only during Fiber Connection Calibration)

- Mouse operations

Function	Description
Move marker	When you click a marker to be moved, a yellow band indicating the allowable range for movement and a red broken line indicating the new marker position after movement are displayed. Dragging the red broken line using the mouse moves the marker. (The "S" marker representing the starting point cannot be moved.)

- Context menu operations

Function	Description
Marker>Add	Adds a marker. A yellow band indicating the allowable range for adding a marker is displayed. Clicking the left mouse button at any position within the yellow band adds a marker at that position.
Marker>Remove	Deletes a marker. Select any marker from C1 to C10 to be deleted.

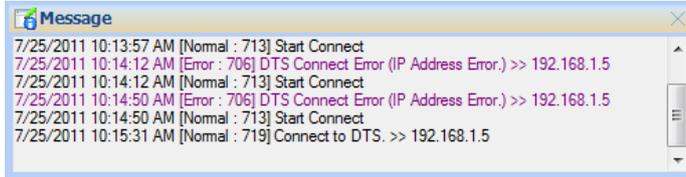
TIP

You can also add, delete or move a marker on the Fiber Connection Calibration dialog.

4.8 Messages

Selecting View>Windows>Message in the main window displays (or if already displayed, gives focus to) the Message window. The Message window can also be displayed by double-clicking on the Message node in the Solution Tree window.

The Message window displays various information and errors. The displayed information includes the time of occurrence, message type, message number and message text.



The following types of messages may be displayed.

Type	Description
Normal	Normal information
Error	An error has been detected (but the application can continue execution.)
FatalError	An error has been detected (and the application cannot continue execution.)
Warning	A warning has been detected (but the application can continue execution.)
Terminated	The application is terminated.



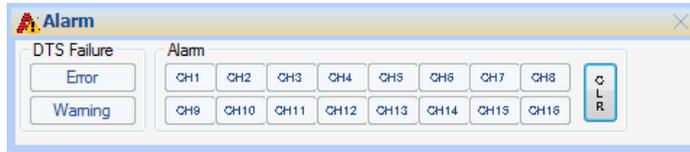
IMPORTANT

- If an Error type message is displayed, the application can continue execution but there may be some limitations on its operation thereafter.
- If a FatalError type message is displayed, it will be followed by a "Terminated" type message and the application will be aborted.

4.9 Alarms

Selecting View>Windows>Alarm in the main window displays (or if already displayed, gives focus to) the Alarm window. The Alarm window can also be displayed by double-clicking on the Alarm node in the Solution Tree window.

The Alarm window displays DTS failure information and temperature alarm information.



- **DTS Failure buttons**

The DTS failure button indicators indicate whether a DTS failure has been detected. If an error or warning has been detected, the corresponding error or warning button turns red. The button reverts to its original color when the error or warning condition is no longer present.

SEE ALSO

Details on a detected error or warning can be checked from maintenance window of the DTSX200.

- **Alarm buttons**

The Alarm button indicator for each channel indicates whether a temperature alarm has been detected for the channel. If a temperature alarm has been detected for the most recent data, the corresponding channel button turns red. If a temperature alarm has been detected for earlier data, the corresponding channel button appears yellow.

Clicking a red or yellow alarm button displays details of the alarm as shown in the figure below.

SEE ALSO

For details on how to define temperature alarms, see Chapter 5.6 , “Displaying Temperature Alarms.”

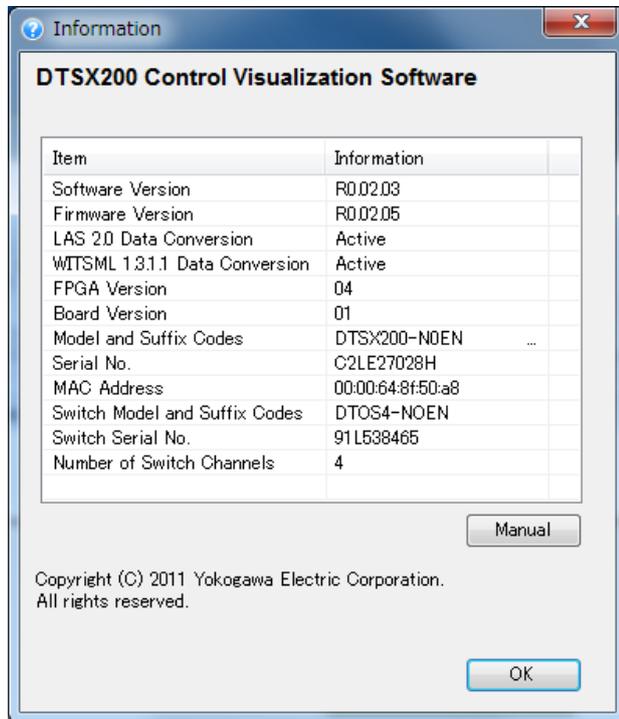


- **[CLR] button for clearing temperature alarms (This button is not displayed in Trace mode)**

Clicking the [CLR] button clears all temperature alarm information and restores all alarm buttons to default color.

4.10 Help

Clicking on the [?] button located at the upper right corner of the main window displays the Information dialog window. The window displays version information about the software in offline state and additional information about the DTSX200 in online state.



The following types of information are displayed in the Information window.

Displayed Item	Description
Software Version	Version of the software
Firmware Version	Version of the firmware of the connected DTSX200
LAS 2.0 Data Conversion	“Active” or “Inactive” is displayed if the LAS 2.0 conversion function installed in the connected DTSX200 is enabled or disabled respectively.
WITSML 1.3.1.1 Data Conversion	“Active” or “Inactive” is displayed if the license for the WITSML 1.3.1.1 conversion function of the connected DTSX200 is enabled or disabled respectively.
FPGA Version	FPGA version of the connected DTSX200
Board Version	Board version of the connected DTSX200
Model and Suffix Codes	Model name and suffix codes of the connected DTSX200
Serial No.	Serial number of the connected DTSX200
MAC Address	MAC address of the connected DTSX200
Switch Model and Suffix Codes	Model number and suffix codes of the optical switch of the connected DTSX200 (if an optical switch is installed)
Switch Serial No.	Serial number of the optical switch of the connected DTSX200 (if an optical switch is installed)
Number of Switch Channels	Number of channels of the optical switch of the connected DTSX200 (if an optical switch is installed)

Clicking the [Manual] button displays the user manual, which is in PDF format. Software capable of displaying PDF files must be pre-installed on the PC to view the user manual.

5. Control Mode

5.1 Control Mode Functions

The Control mode is used for setting various measurement parameters of the DTSX200, as well as starting and stopping measurement by the DTSX200.

(1) Setting Measurement Parameters

Measurement parameters include measurement-related settings and calculation-related settings. The former is used for configuring measurement of Raman scatter signal levels while the latter is used for configuring temperature data calculation using measured signal level data.

The software supports recalculation of temperature data so any modification to calculation-related settings during measurement or after measurement completion is reflected in measurement result display.

TIP

- Any modification to calculation-related settings during measurement or after measurement completion is reflected only in measurement result display but not in saved measurement result data.
-

(2) Starting and Stopping Measurement

You can start and stop measurement by the DTSX200 by clicking the [Start] button and [Stop] button respectively.

(3) Saving Measurement Result Data

The software allows trace data (measurement result data) of the DTSX200 to be saved on a PC.

Moreover, time series data can be saved for use in time series chart display (with time on the X-axis).

Data saved to a PC can be retrieved in Trace mode after measurement completion.

TIP

- Measurement result data and time series data can be saved only when the software is connected to the DTSX200.
Measurement result data and time series data cannot be saved when the software is not running or when the software is disconnected from the DTSX200 due to communication error or some other reason.
 - Measurement result data is known as trace data, files containing trace data are known as trace files and folders containing trace files are known as trace folders.
-

(4) Measurement Result Display

Measurement result data of the DTSX200 can be displayed as charts.

(5) Status Display

Status display functions include DTSX200 status display and software status display.

- DTSX200 status display
 - Alarm window:
 - Displays status information on temperature alarms detected by the DTSX200, as well as failure/error status of the DTSX200.
 - Status bar (measurement status display):
 - Displays measurement status information (whether measurement is in progress or not) and measurement progress status information (percentage completion).
- Software status display
 - Message window:
 - Displays various errors and warnings detected by the software.
 - Status bar (connection status display):
 - Displays the status of the communication connection between the software and the DTSX200.

(6) Self-test Execution

Self test of the DTSX200 can be executed and the test result displayed from the Self Test dialog.

(7) Enabled and Disabled Functions

Individual functions of Control mode may be enabled or disabled depending on the system status as shown in the table below.

Function	Window, Dialog or Button	System Status			
		Offline state	Online state		
			Connected to DTSX200		Disconnect ed from DTSX200
Measurement in progress	Measurement not in progress				
Setting measurement parameters	Sequence Setting dialog	O	Δ(*1)	O	Δ(*1)
	Channel Setting dialog (excluding Fiber Setting tab)	O	Δ(*1)	O	Δ(*1)
	Channel Setting dialog (Fiber Setting tab)	O	Δ(*1)	O(*2)	Δ(*1)
Starting and stopping measurement	Start button	X	X	O	X
	Stop button	X	O	X	X
Saving measurement result	Trace Storage Config dialog	O	Δ(*1)	O	Δ(*1)
Measurement result display	Viewer Chart window	X	O	X(*3)	X(*3)
	Viewer Config dialog	O	O	O	O
Status display	Alarm window	X	O	O	X(*3)
	Message window	O	O	O	O
	Status bar (Measurement status display)	X	O	O	X
	Status bar (Connection status display)	O	O	O	O
Self-test execution	Self Test dialog	X	X	O	X

*1: Display only. No modification is allowed.

*2: Any modification to settings is reflected in measurement result display but not in saved measurement result data.

*3: Displays the status at the time of the last measurement.

O: Enabled

Δ: Enabled but with restrictions

X: Disabled

A disabled dialog cannot be displayed.

A disabled window is displayed but not updated.

A disabled button cannot be pressed.

5.2 Preparing for Measurement

Before starting measurement, you need to specify measurement parameters and configure the saving of measurement results.

SEE ALSO

For details on how to set measurement parameters, see sections of Chapter 5, starting from Section 5.3.

■ Saving measurement results

The software allows measurement result data of the DTSX200 to be saved to files on a PC. Files containing saved measurement result data can be used for chart display.

TIP

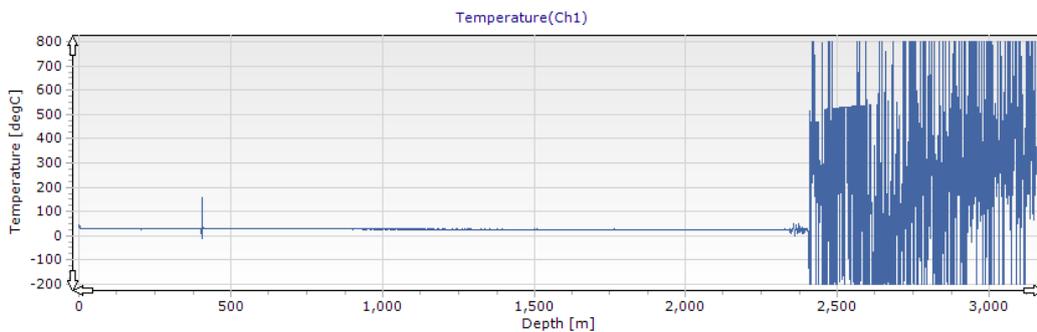
The following terms will be used hereafter.

- Trace data refers to measurement result data.
- Trace file refers to a file containing trace data.
- Trace folder refers to a folder storing trace files.

Two types of measurement result data can be saved to a trace folder.

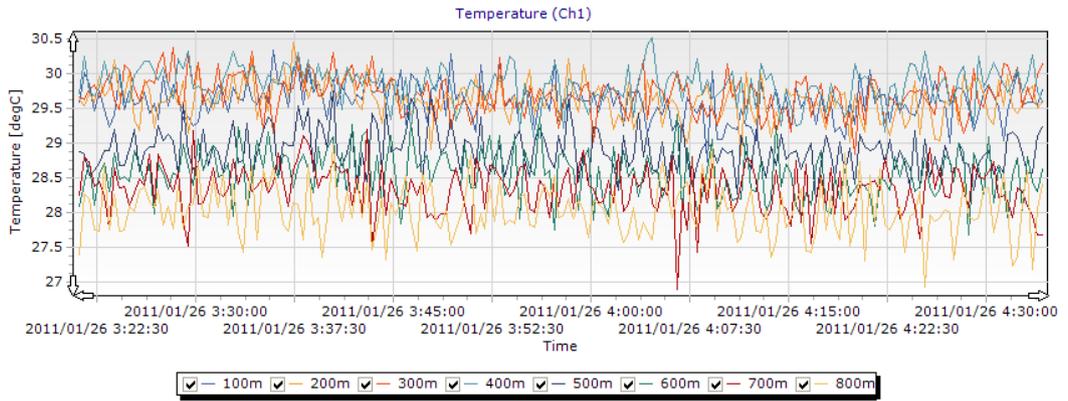
1. Trace data (measurement result data)

Trace data refers to measurement result data of the DTSX200. By saving trace data, measurement result can be displayed in a chart with distance on the X-axis.



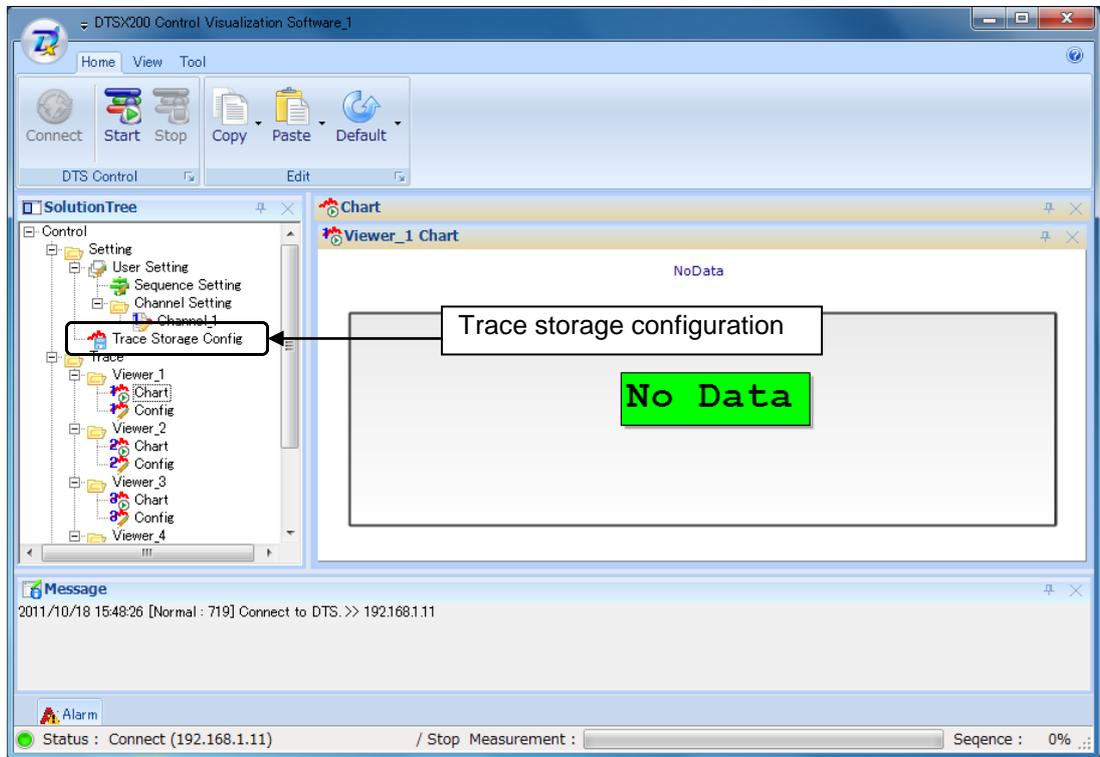
2. Time series data

Time series data records temperature changes over time at a specified depth. By saving time series data, measurement result can be displayed in a chart with time on the X-axis.



● Trace Storage Config dialog

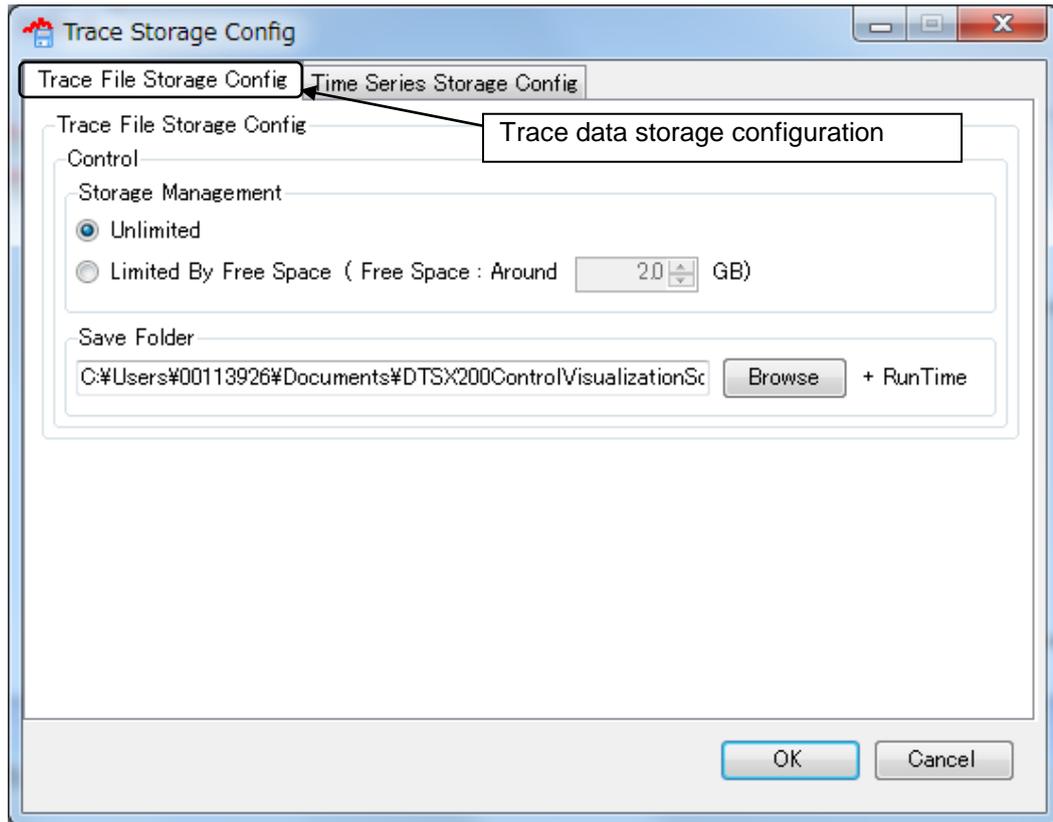
The Trace Storage Configuration dialog can be displayed by double-clicking on the Trace Storage Config node in the Solution Tree window as shown in the figure below.



TIP

- Trace data and time series data can be saved only when the software is connected to the DTSX200.
- Trace file refers to a file containing trace data. Trace data and time series data cannot be saved when the software is not running or when the software is disconnected from the DTSX200 due to communication error or some other reason.

● Trace File Storage Config tab



Selecting the Trace File Storage Config tab displays a tab window for configuring the storage of trace data (measurement result data).

You can specify the trace storage folder, as well as whether trace data storage is to be limited by the amount of free space left. If a free space limit is specified, trace data storage and measurement result display stop when free space falls below the specified limit.

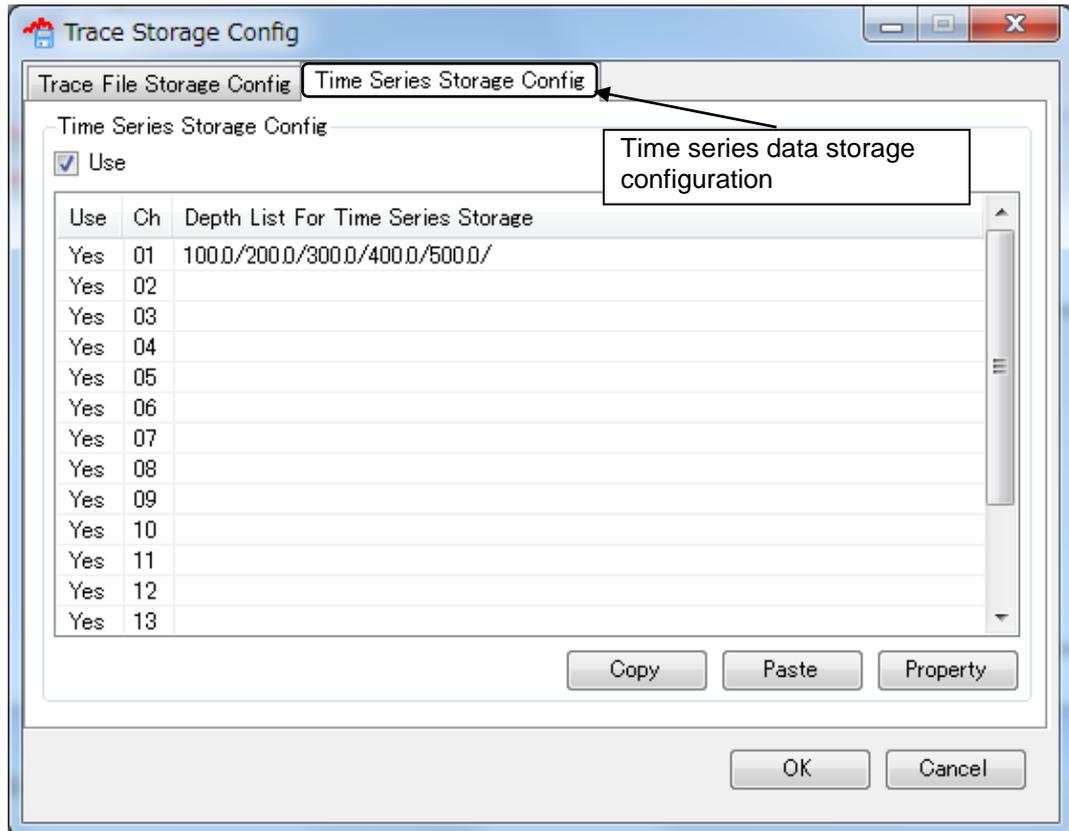
To configure storage of trace data:

1. Under Storage Management, select whether trace data storage is to be Limited by free space or Unlimited.
2. If you have selected for storage to be limited by free space, specify a free space limit from 1.0 [Gbyte] to 100000.0 [Gbyte].
3. In the Save Folder field, specify a trace folder for storing trace files. If the specified folder does not exist, an error will be reported when you press the [OK] button.

TIP

- Trace data storage cannot be turned off. Therefore, we recommend to delete unwanted trace folders and trace files regularly.
- Even if you have selected Unlimited for storage management, if the specified trace folder is on a system drive (C:), trace data storage stops automatically when free space on the drive is about 1 gigabyte or less.
- The specified free space limit is observed by the software but not strictly.
- We recommend specifying a trace folder on an internal hard disk of the PC. If a network drive is specified, communication error may cause trace data storage or time series data storage to fail.

● Time Series Storage Config tab



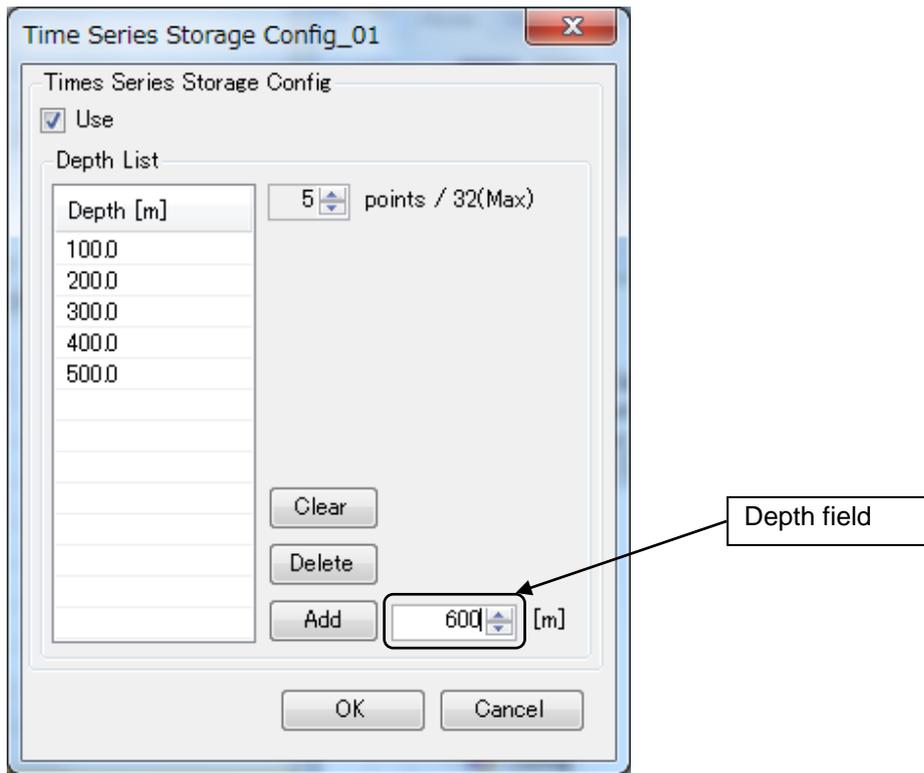
Selecting the Time Series Storage Config tab displays a tab window for configuring the storage of time series data.

You can specify whether to enable or disable storage of time series data, as well as specify a list of depths for saving temporal temperature data for each optical switch channel using the following procedure.

1. Select the Use checkbox to enable time series data storage; deselect the checkbox to disable time series data storage.
2. If the Use checkbox is selected, the Depth list for time series storage column displays a list of depths for storing temporal temperature data for each individual optical switch channel.
3. To specify the depth list for time series data storage for a channel, display the Time Series Storage Config dialog. To do so:
 - Double-click on the required channel in the Ch list; or
 - With the required channel selected, click the [Property] button.
4. You can copy the depth list of one channel to another channel. To do so, select the source channel from the Ch list and click the [Copy] button. Next, select the destination channel and click the [Paste] button.

TIP

- If a specified depth is outside the measurement range, 0°C is stored.
- Up to 3000 time series data points can be stored. If more than 3000 data points are measured, the most recent 3000 time series data measurements are stored.
- If continuous measurement is interrupted by communication problem, DTSX200 reboot or some other reason, time series data will be stored up to measurement interruption.



The Time Series Storage Config_{nn} dialog is used to specify a depth list for time series data storage for a channel.

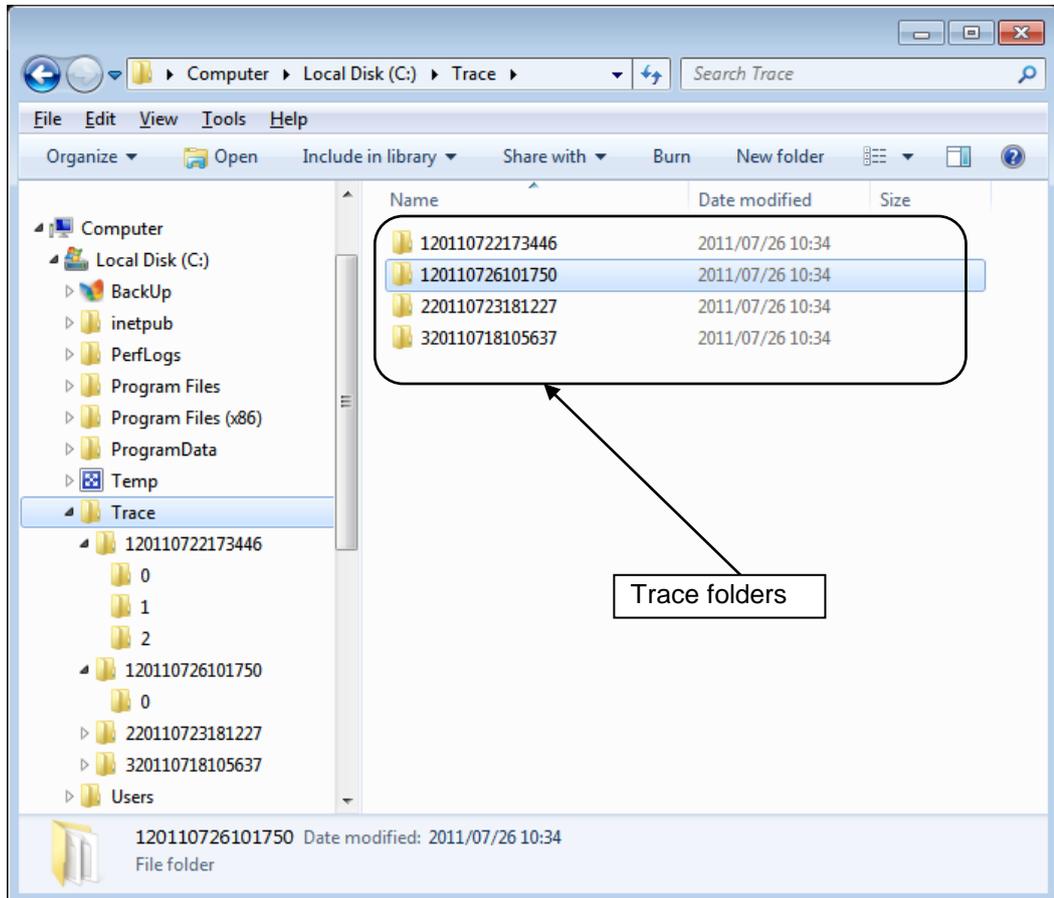
You can specify whether to enable or disable time series data storage for the channel, as well as specify a list of depths for storing temporal temperature data.

1. Select the Use checkbox to enable time series data storage for the channel; deselect the checkbox to disable time series data storage.
2. To add a depth for temporal temperature data storage to the depth list, enter a value from 0.0 to 30000.0 [m] in the Depth field shown in the figure above, and click the [Add] button. The entered depth is added to the depth list.
3. Up to 32 depths can be specified for temporal temperature data storage.
4. To delete all depths in the list, click the [Clear] button.
5. To delete a depth from the list, select the depth to be deleted and click the [Delete] button.

● Trace file structure



Consider an example where the destination for storing a trace folder is specified in Save Folder as “C:\Trace” as shown in the figure above. The resultant trace folder and file structure is shown in the figure below.

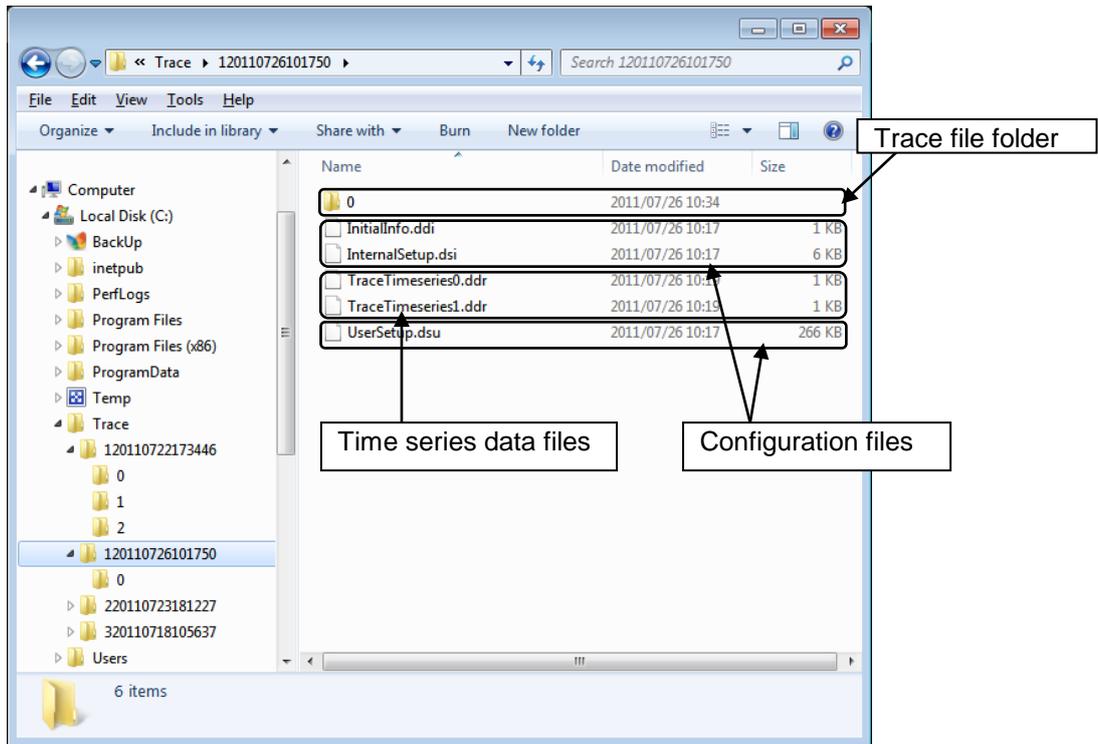


A trace folder is created below the “C:\Trace” folder by the DTSX200 at the beginning of each measurement.

The first digit of the trace folder name indicates the application launch ID and the next 14 digits indicate the measurement start time (YYYYMMDDhhmmss).

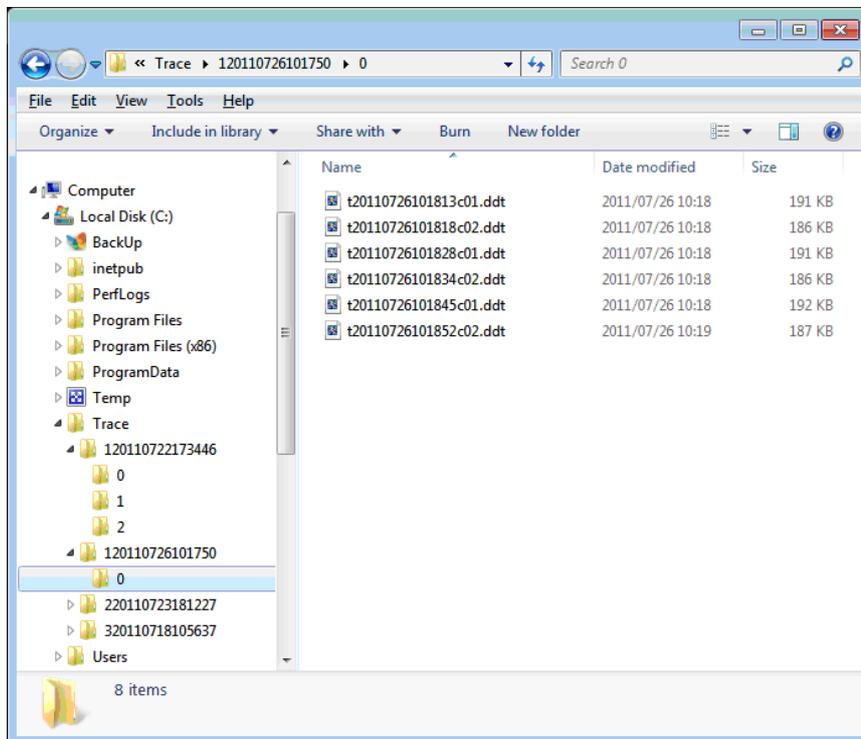
TIP

- Do not change the structure or names of subfolders and files below a trace folder. Otherwise, data loading by the software may fail or an error may occur after loading.
- Always specify a trace folder when copying or deleting trace data. Loading by the software will fail if only subfolders or files under a trace folder are copied.
- The measurement start time is acquired from the DTSX200.



Trace file folders, configuration files and time series data files are created below a trace folder.

1. A new trace file folder is created each time 100 trace files have been created. Trace file folders are assigned names serially starting from 0.
2. Configuration files store settings prevailing at the time of measurement.
3. A time series data file is created for each optical switch channel.



Trace files are created below a trace file folder.

The trace file name begins with the letter t followed by 14 digits indicating the end time of each measurement (YYYYMMDDhhmmss), the letter c and 2 digits indicating the optical switch channel number.

TIP

- Configuration files, time series data files and trace files have non-published, proprietary formats.
- Do not modify the content of configuration files, time series data files and trace files. Otherwise, data loading by the software may fail or an error may occur after loading.
- The measurement end time is acquired from the DTSX200.

The table below shows a sample trace folder/file structure.

Folder Structure	Description
C:\Trace	Destination for storing trace folder specified in Save Folder
<u>120110722173446</u>	Trace folder (created at the beginning of each measurement)
0	Trace file folder 0
1	Trace file folder 1
2	Trace file folder 2
<u>120110726101750</u>	Trace folder (created at the beginning of each measurement)
0	Trace file folder 0
<u>220110723181227</u>	Trace folder (created at the beginning of each measurement)
0	Trace file folder 0
<u>320110718105637</u>	Trace folder (created at the beginning of each measurement)
0	Trace file folder 0
1	Trace file folder 1
File Structure	Description
<u>120110722173446</u>	Trace folder (created at the beginning of each measurement)
UserSetup.dsu	Configuration file
InternalSetup.dsi	Configuration file
InitialInfo.ddi	Configuration file
TraceTimeseries0.ddr	Time series data file (for optical switch channel 1)
TraceTimeseries1.ddr	Time series data file (for optical switch channel 2)
0	Trace file folder 0
<i>t20110726101813c01.ddt</i>	Trace file (measurement result file)
<i>t20110726101818c02.ddt</i>	Trace file (measurement result file)
<i>t20110726101828c01.ddt</i>	Trace file (measurement result file)
<i>t20110726101834c02.ddt</i>	Trace file (measurement result file)
<i>t20110726101845c01.ddt</i>	Trace file (measurement result file)
<i>t20110726101852c02.ddt</i>	Trace file (measurement result file)

Bolded text indicates a folder name.

Shaded text indicates a file name.

Underlined text indicates a trace folder name which can be specified for loading in Trace mode.

Italicized text indicates a trace file name which can be specified for loading in Trace mode.

5.3 Single-ended Measurement

The DTSX200 supports both single-ended and double-ended temperature measurement. In single-ended measurement, a light pulse is launched from one end of the optical fiber and the returned Raman scatter is measured to determine temperature distribution. In double-ended temperature measurement, a light pulse is launched from each of the two ends of the optical fiber and the returned Raman scatter is measured separately to determine temperature distribution. This Section describes how to perform single-ended measurement.

SEE ALSO

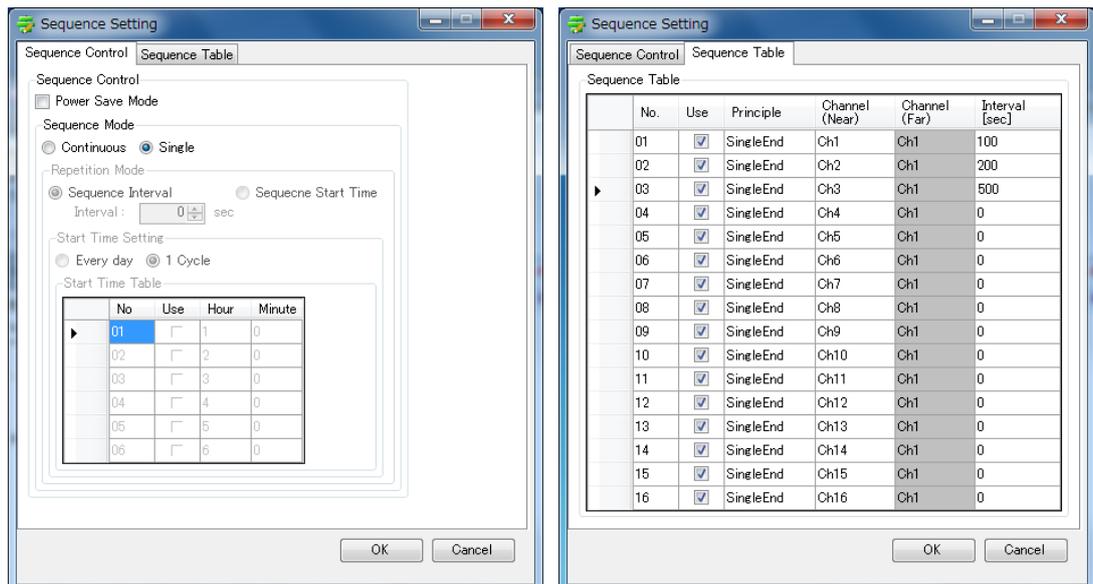
For details on single-ended measurement, see “Single-ended Measurement and Double-ended Measurement” of the DTSX200 Guide (IM39J06B45-01E).

1. First, display the Sequence Setting dialog to configure a measurement sequence.
2. On the Sequence Control tab window, select the Sequence Mode as Single or Continuous.

SEE ALSO

For details on the single and continuous sequence modes, see Section 5.5, “Single and Continuous Sequence Measurement.”

3. Define a sequence table on the Sequence Table tab window.
 - Temperature measurement proceeds in ascending order of No. for channels whose Use checkbox is selected.
 - Select SingleEnd from the pull-down menu of Principle for single-ended measurement.
 - Select the channel to be measured from the pull-down menu of Channel(Near).
 - Specify a sequence interval in Interval[sec].
4. After editing is completed, click [OK]. The settings are saved and the dialog closes. Clicking [Cancel] closes the dialog without saving edited settings.



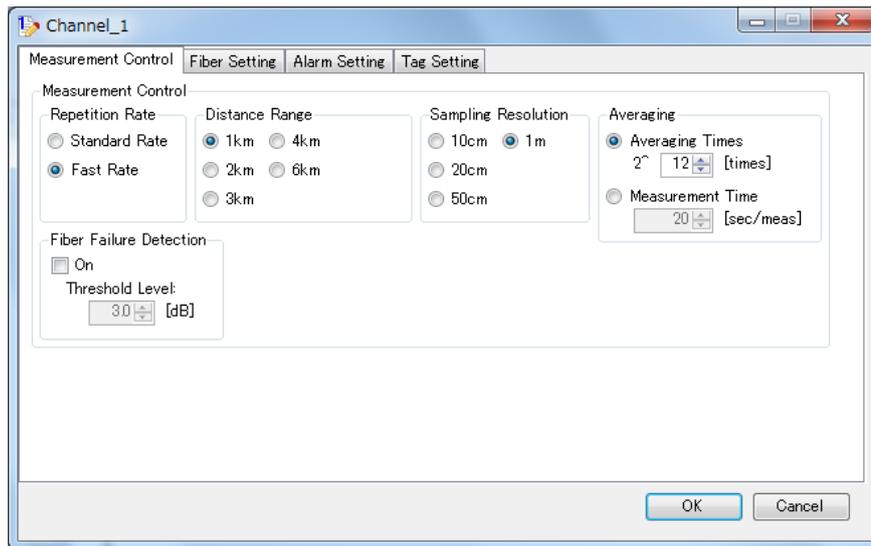
Item	Description	Type
No.	Indicates the order in the measurement sequence.	—
Use	Enables or disables measurement for a channel.	M
Principle	Select either SingleEnd or DoubleEnd for single-ended or double-ended measurement respectively.	M
Channel (Near)	Select the near-end measurement channel.	M
Channel (Far)	Select the far-end measurement channel.	M
Interval [sec]	Specify a sequence interval.	M

* Type M indicates a measurement-related setting.

TIP

- The Channel(Far) setting is disabled if single-ended measurement is selected.
- If the specified sequence interval is shorter than the measurement time, the following measurement starts immediately.
- If an entered sequence interval is invalid, it is reverted to its original value and an error provider is displayed at the row header .
- Clicking [OK] with no Use checkbox selected or a duplicate channel number specified causes an error message to be displayed.

5. Next, display each Channel_n dialog (where n denotes a channel number) to configure each channel in turn.



6. Specify each parameter on the Measurement Control tab. The following table describes each parameter.

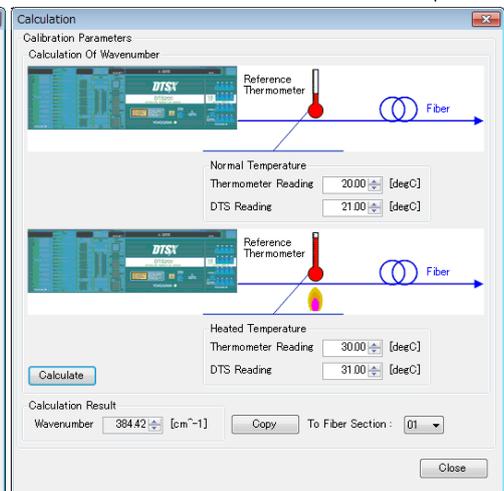
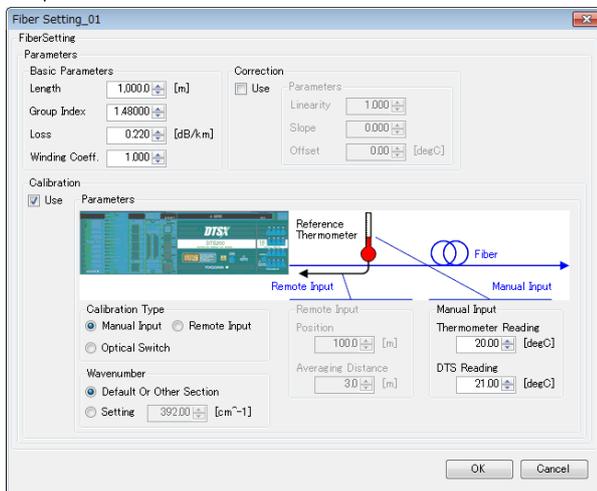
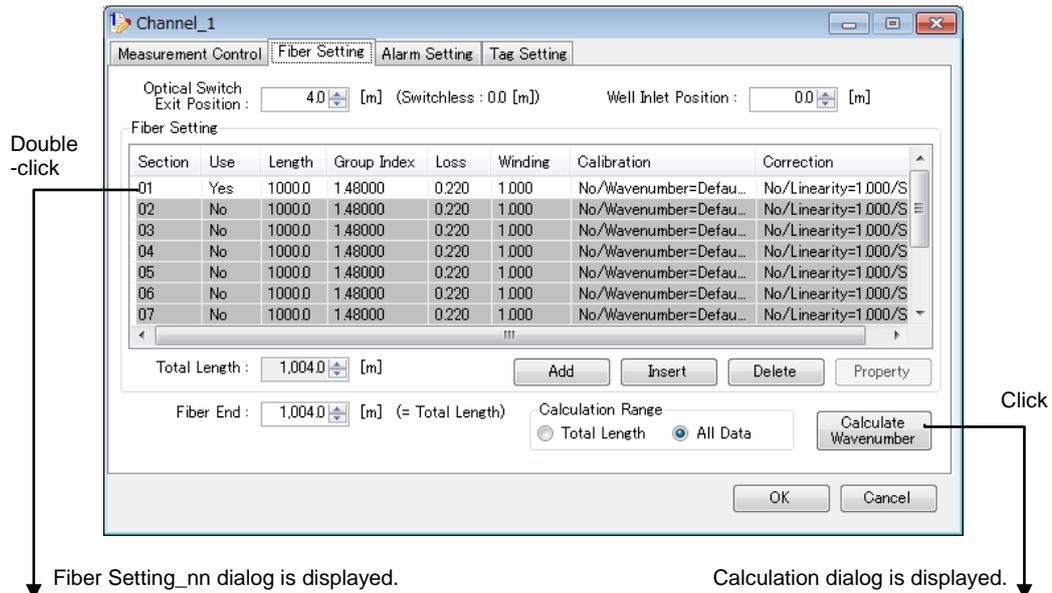
Item	Description	Type
Repetition Rate	This parameter determines the rate for pulse repetition. Select Standard Rate if the far-end of the fiber does not have anti-reflection termination to avoid measurement error due to reflection.	M
Distance Range	The specified distance range must be longer than the fiber length.	M
Sampling Resolution	This parameter determines the sampling resolution for A/D conversion. If the specified sampling resolution is shorter than 1 m, multi-sampling is performed by shifting the sampling time .	M
Averaging	This parameter specifies the number of times measurement is to be repeated for averaging purpose. Averaging can be used to improve the signal-noise ratio when the Raman scatter signal level is very weak, If Measurement Time is selected, the specified measurement time is used to determine the number of measurements to be used for averaging.	M
Fiber Failure Detection	Select the ON checkbox to enable fiber failure detection. If enabled, specify a threshold level for fiber failure detection.	M
Repetition Rate	This parameter determines the rate for pulse repetition. Select normal rate if the far-end of the fiber does not have anti-reflection termination to avoid measurement error due to reflection.	M

* Type M indicates a measurement-related setting.

TIP

- The Measurement Time setting refers solely to the measurement duration for averaging. It does not include time for hardware preparation, temperature calculation, alarm detection, section data creation, file creation, data transfer and other auxiliary time.
- Fiber failures that are close to the fiber near-end may fail to be detected.

7. Next, specify each parameter on the Fiber Setting tab window.



The following table describes each item on the Fiber Setting tab window.

Item	Description	Type
Optical Switch Exit Position	This parameter defines the exit position of the optical switch.	C
Well Inlet Position	This parameter determines the well inlet position. If Depth is specified for an axis in chart display, the well inlet position is displayed as 0 m.	C
Fiber Setting list	The Fiber Setting section lists the settings for each fiber section.	—
Total Length	This field displays the sum of the lengths of all fiber sections.	—
Fiber End	This parameter defines the fiber end. Any position beyond this specified value is detected as fiber failure.	M
[Add] button	Clicking the [Add] button enables the row following the row currently enabled in the list.	—
[Insert] button	Clicking [Insert] with any row in the list selected inserts a new enabled row and deletes the last row.	—
[Delete] button	Clicking [Delete] deletes the selected row and adds a disabled row at the end of the list.	—
[Property] button	Clicking [Property] with any row selected displays the Fiber Setting_* dialog (where * denotes the fiber section number). Double-clicking any row produces the same result.	—

Calculation Range	Select the [Total Length] option to display chart data up to the total fiber length if data display beyond that is not required. Select the [All Data] option to display chart for all data used in temperature calculation. * In Calibration mode, the [Total Length] option is not available and the [All Data] option is always used.	C
[Calculate Wavenumber] button	Clicking [Calculate Wavenumber] displays the Calculation dialog.	—

* Type M indicates a measurement-related setting while type C indicates a calculated-related setting.

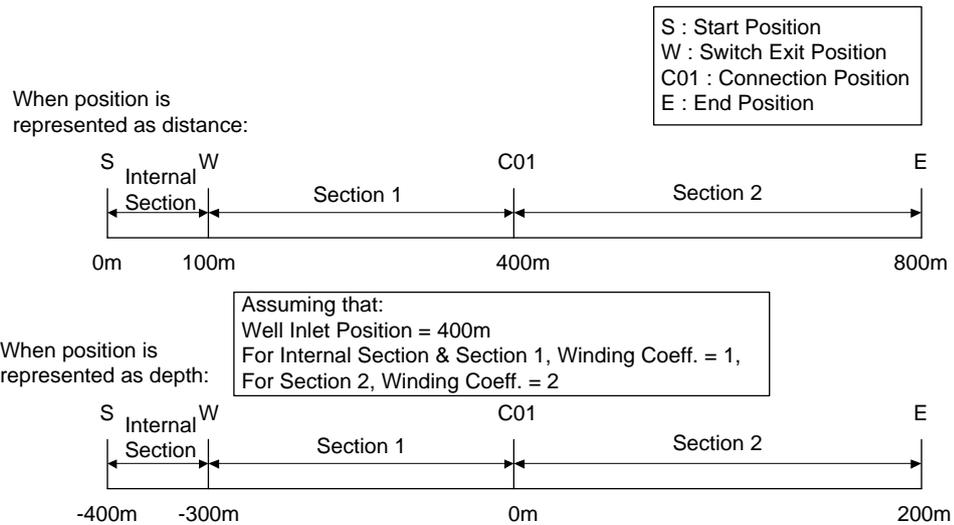
Specify the calculation-related parameters for each fiber section using the Fiber Setting_nn dialog where nn denotes a fiber section number from 01 to 10. The table below describes the calculated-related parameters.

Item	Description	Type
Basic Parameters	The section defines the basic fiber parameters.	—
Length	Specify the fiber length of a fiber section.	C
Group Index	Specify the group index of a fiber section. This parameter applies to a distance axis.	C
Loss	The Stokes and anti-Stokes signals of the Raman scatter suffer different fiber loss because of their different wavelengths. Specify the differential loss for a fiber section to correct for this temperature error.	C
Winding Coeff.	Specify the winding coefficient of a fiber section. This parameter relates to depth.	C
Correction	This section defines the temperature correction for a fiber section.	—
Use	Select this checkbox to enable temperature correction.	C
Linearity	This parameter relates to the temperature scale.	C
Slope	This parameter relates to the temperature slope. (* It represents the temperature change [degC] per 100 meters.)	C
Offset	This parameter relates to the temperature offset.	C
Calibration	This section defines temperature calibration for a fiber section.	—
Use	Select this checkbox to enable temperature calibration.	C
Calibration Type	Select the type of temperature calibration to be performed.	—
Manual Input	Select this option to enable the Manual Input group box and use its settings for calibration.	C
Remote Input	Select this option to enable the Remote Input group box and use its settings for calibration. * This option is valid only when a reference thermometer is available at a specified position and communication with the DTSX200 is open so that the thermometer temperature readings can be transmitted to the DTSX200. With this option, the DTS temperature measurement is calibrated using the transmitted thermometer readings and the DTSX200 measurement values at the same position.	C
Optical Switch	Select this option to use settings stored in the optical switch memory for calibration. * This option can only be selected for the first fiber section. * If this option is selected but no optical switch is installed, temperature calibration is not performed.	C
Wavenumber	This group box selects and defines the wavenumber to be used for temperature calculation.	—
Default Or Other Section	Select this option to use the default wavenumber value or the wavenumber value specified for other fiber sections. * If wavenumber is specified for multiple fiber sections, their average value is used.	C
Setting	Select this option to use the specified wavenumber value.	C
Remote Input	Select this option to calibrate DTSX200 temperature measurement using data at a specified position.	—
Position	Specify the position for temperature calibration.	C
Averaging Distance	Specify the distance in meters centered on the specified position to be used for averaging.	C
Manual Input	Select this option to calibrate DTSX200 temperature measurement using an actual thermometer temperature reading (temperature offset calibration).	—

		Thermometer reading	Specify the thermometer temperature reading (actual value).	C
		DTS reading	Specify the DTSX200 temperature measurement reading.	C

* Type C indicates a calculated-related setting.

The well inlet position and winding coefficient parameters are used for converting distance to depth as shown in the example below.



The Calculation dialog can be used for calculating the wavenumber. The table below describes the settings in this dialog.

Item	Description
Normal Temperature	Specify settings for normal (low) temperatures.
Thermometer Reading	Specify a thermometer temperature reading.
DTS Reading	Specify the DTSX200 measured temperature before temperature calibration.
Heated Temperature	Specify settings for high temperatures.
Thermometer Reading	Specify a thermometer temperature reading.
DTS Reading	Specify the DTSX200 measured temperature before temperature calibration.
[Calculate] button	Clicking [Calculate] begins wavenumber calculation.
Wavenumber	The calculated wavenumber is displayed in this field.
[Copy] button	Clicking [Copy] updates the specified fiber section with the calculated wavenumber. (The value is updated to the specified fiber section in the Fiber Setting list.)
To Fiber Section	Select the fiber section to be updated with the calculated wavenumber.
[Close] button	Clicking [Close] closes the Calculation dialog.

TIP

- The Double End Setting tab is not displayed in the Channel dialog for a channel specified for single-ended measurement.
- Except for the Fiber End parameter, all parameters on the Fiber Setting tab window are calculation-related settings. Modification to any of these parameters even after measurement completion can be reflected on displayed charts.
- Settings on the Fiber Setting_nn dialog and Calculation dialog correspond to the Fiber Parameter Calibration dialog of Calibration mode. For details on how to specify each parameter, see Chapter 7, "Calibration Mode."

8. After specifying all the required settings, check that the sensing fiber is properly connected to the DTSX200 and then click the [Start] button on the main window to start measurement.

9. When measurement completes, the chart display is updated. Thereafter, the next measurement is started according to the specified Interval on the Sequence Table tab of the Sequence Setting dialog. When measurement completes, the chart display is again updated. This process is repeated until the [Stop] button is clicked or the sequence ends.

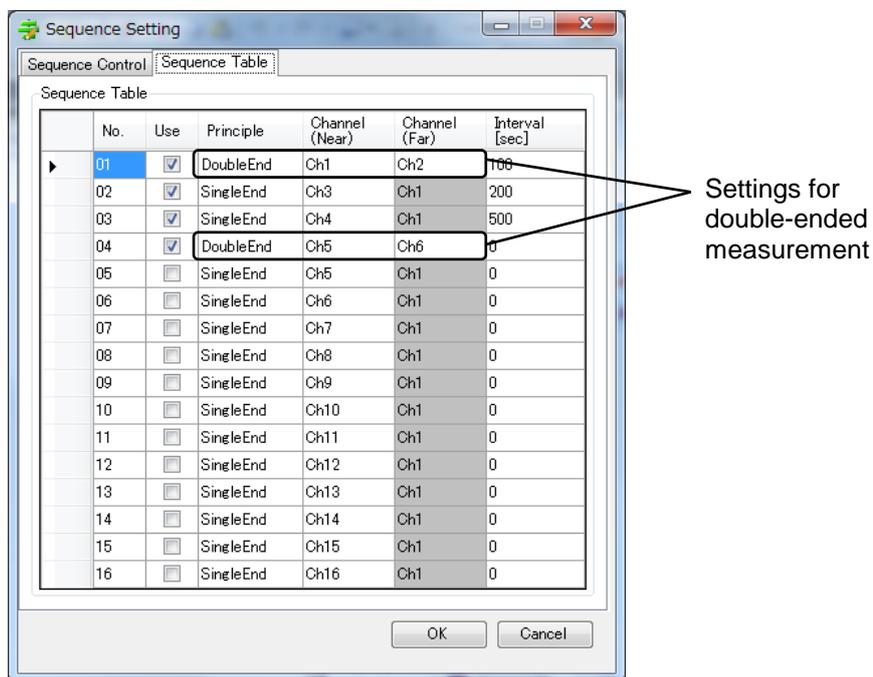
5.4 Double-ended Measurement

This section describes the procedure for performing double-ended measurement with light pulses launched from both ends of an optical fiber.

SEE ALSO

For details on the measurement method, see “Single-ended Measurement and Double-ended Measurement” of the DTSX200 Guide (IM39J06B45-01E).

1. Similarly to single-ended measurement, display the Sequence Setting dialog and specify the sequence settings. To specify double-ended measurement for a channel, select DoubleEnd from the pull-down menu of Principle on the Sequence Table tab window. When DoubleEnd is selected, Channel(Far) is enabled. Select the far-end channel from the pull-down menu of Channel (Far).



2. Next, display the Channel_n dialog for each channel (where n denotes the channel number) in turn and specify the channel settings.
 - Similarly to single-ended measurement, specify the measurement parameters on the Measurement Control tab window.

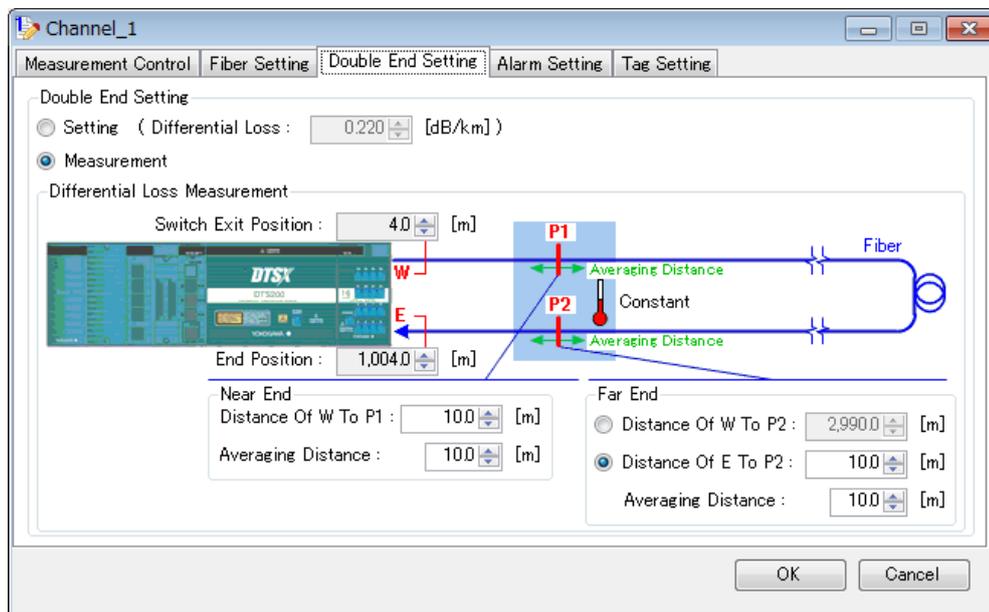
TIP

- In double-ended measurement, only the channel settings of the specified near-end channel (Channel(Near)) are used in measurement and calculation. Channel settings of the far-end channel (Channel(Far)) are disabled. The channel settings of the near-end channel are used for both forward direction measurement and reverse direction measurement.
- Measurement is repeated for the number of times specified for averaging (Averaging Times) separately in the forward direction and reverse direction.
- If Fiber Failure Detection is not turned on, a fiber failure, if it occurs, will not be detected so measurements from both directions will be combined, leading to incorrect measurement results.
- Fiber failures that are close to the fiber near-end may fail to be detected.

- Similarly to single-ended measurement, specify the various calculation parameters on the Fiber Setting tab window.

TIP

- For double-ended measurement, the Loss setting need not be specified because measurement results of the forward and reverse directions are combined. Even if specified, it will not affect the temperature calculation result.
 - However, the Loss setting is required when a fiber failure is detected. If this happens, the measurement results up to the fiber failure position of the forward and reverse directions are combined.
-
- The Double End Setting tab is displayed for a channel configured for double-ended measurement. As measurement results of the forward and reverse directions are combined in double-ended measurement, loss correction is not required. However, absolute temperature correction is still required. In double-ended measurement, temperature correction is made for the total differential loss between the Stokes and anti-Stokes light over the full fiber length.



Item	Description	Type
Setting	Select this option and enter a value manually for the total differential loss between the Stokes and anti-Stokes signals over the full fiber length to perform temperature correction using this value.	C
Measurement	Select this option to have the system automatically determine by measurement the total differential loss between the Stokes and anti-Stokes signals over the full fiber length and use it for temperature correction. Specify near-end and far-end positions for differential loss measurement as described below.	C
Near End	Group box for specifying a near-end position for differential loss measurement.	—
Distance Of W To P1	Specify position P1 of constant temperature by its distance from the switch exit position.	C
Averaging Distance	Specify the distance in meters centered on P1 to be used for correction.	C
Far End	Group box for specifying a far-end position for differential loss measurement.	—
Distance Of W To P2	Specify position P2 of constant temperature by its distance from the switch exit position.	C
Distance Of E To P2	Specify position P2 of constant temperature by its distance from the fiber end.	C
Averaging Distance	Specify the distance in meters centered on P2 to be used for correction.	C
Switch Exit Position	This field displays the switch exit position.	—
End Position	This field displays the total fiber length. * It displays the Total Length value on the Fiber Setting tab.	—

* Type C indicates a calculation-related setting.

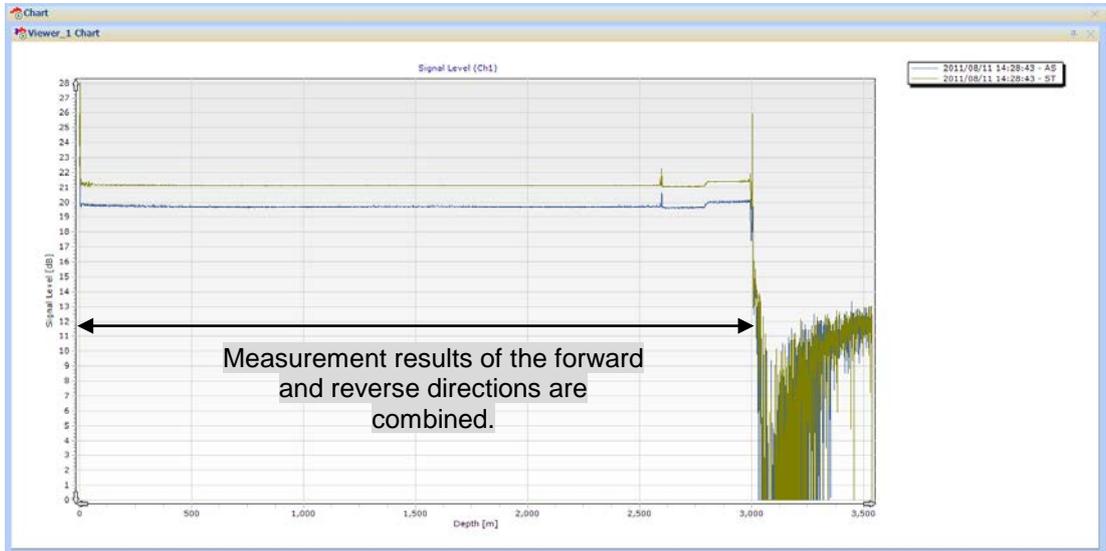
TIP

- If you have selected Setting, we recommend using the default value of 0.220 [dB/km] for Differential Loss. Enter 0.000 [dB/km] to perform no correction.
- If you have selected Measurement, beware that the temperatures of the specified near-end and far-end positions must be the same.
- With the Measurement option, if continuous sequence mode is selected, differential loss is averaged over the repeated measurements. This improves the accuracy especially for the far-end where signal-to-noise ratio is poor.
- Beware that the Distance Of W To P1 and Distance Of W To P2 settings refer to distances from the switch exit position but not distances from the DTSX200 exit position.

3. After specifying all the required settings, check that the sensing fiber is correctly connected to the DTSX200 and click the Start button on the main window to start measurement.
4. When measurement completes, the chart display is updated. Thereafter, the next measurement is started according to the specified Interval on the Sequence Table tab of the Sequence Setting dialog. When measurement completes, the chart display is again updated. This process is repeated until the [Stop] button is clicked or the sequence ends.

- When fiber failure is not detected

Example: Signal Level

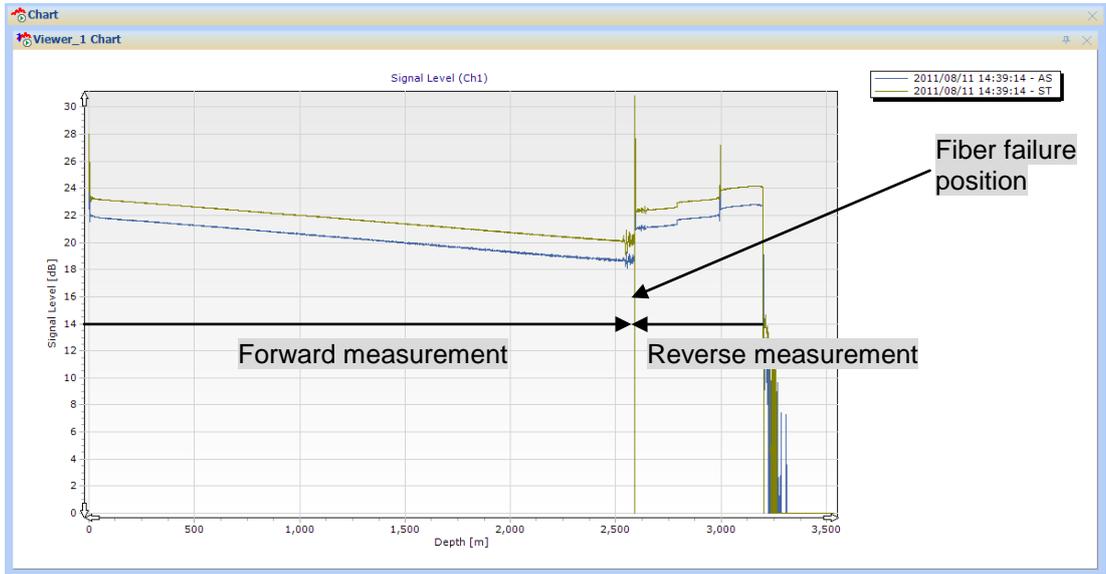


Example: Temperature



- When fiber failure is detected

Example: Signal Level

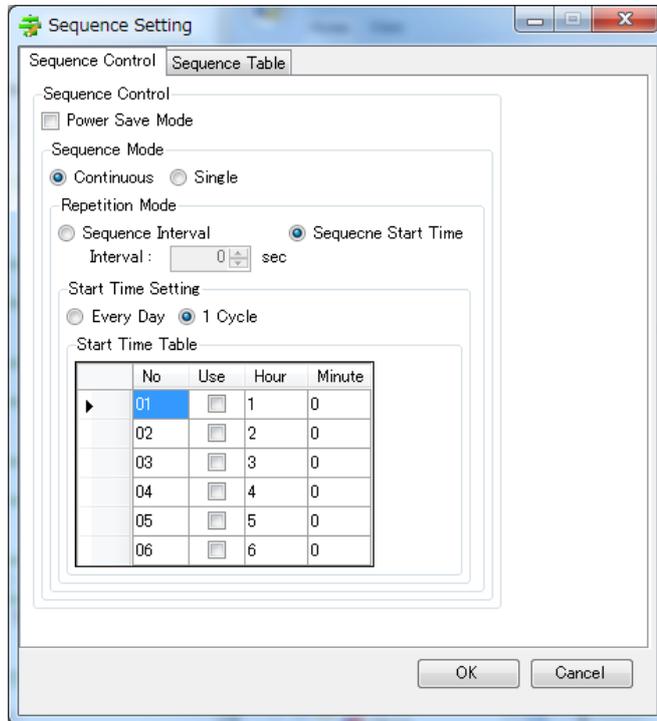


Example: Temperature

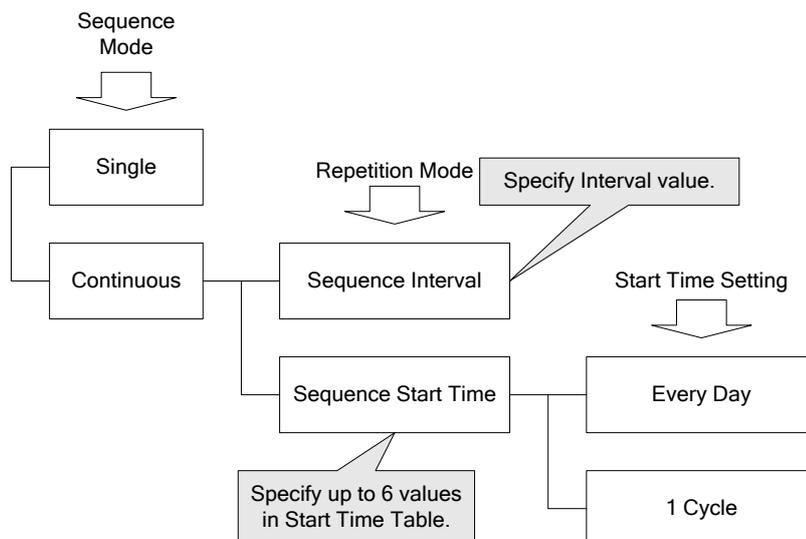


5.5 Single and Continuous Sequence Measurement

You can select to execute a measurement sequence repeatedly or only once by selecting Continuous or Single respectively for Sequence Mode in the Sequence Setting dialog.



If you have selected continuous sequence execution, you can specify a fixed sequence interval or specify a table of start times for repeating the sequence execution by selecting Sequence Interval or Sequence Start Time respectively for Repetition Mode. Finally, you can select to apply the entered list of start times every day or once only by selecting Every Day or 1 Cycle for Start Time Setting. The flowchart below illustrates the various setting options available.



The table below lists and describes each parameter in the Sequence Setting dialog.

Item	Description	Type
Power Save Mode	Select this checkbox to enable power saving mode.	M
Sequence Mode	Select whether to execute the measurement sequence defined on the Sequence Table tab window only once or repeatedly.	M
Continuous	Select this checkbox to execute the sequence repeatedly according to the specified Repetition Mode.	M
Sequence Interval	Select this checkbox to specify a fixed interval for repeating sequence execution. Sequence execution begins when measurement is started and when the sequence is completed, it is repeated after waiting according to the specified Interval. The specified interval defines the interval between the starting times of two successive sequence executions. If the specified interval is shorter than the time for one sequence execution, the next sequence execution begins immediately after the current sequence execution ends.	M
Sequence Start Time	Select this option to specify up to 6 start times in the Start Time Table for repeating sequence execution. If the next specified start time is exceeded when a sequence execution ends, the next sequence execution begins immediately.	M
Every Day	Select this option to begin sequence execution at each start time specified in the Start Time table every day.	M
1 Cycle	Select this option to perform one cycle of sequence executions according to the start times specified in the Start Time table.	M
Start Time Table	You can specify up to six start times. Sequence execution is carried out in ascending order of No. No. : Displays a read-only running number. Use: Select this checkbox to enable a start time setting. Hour: Specify the hour for the start time as an integer from 01 to 23. Minute : Specify the minute for the start time as an integer from 0 to 59.	M
Single	Select this option to execute the measurement sequence only once.	M

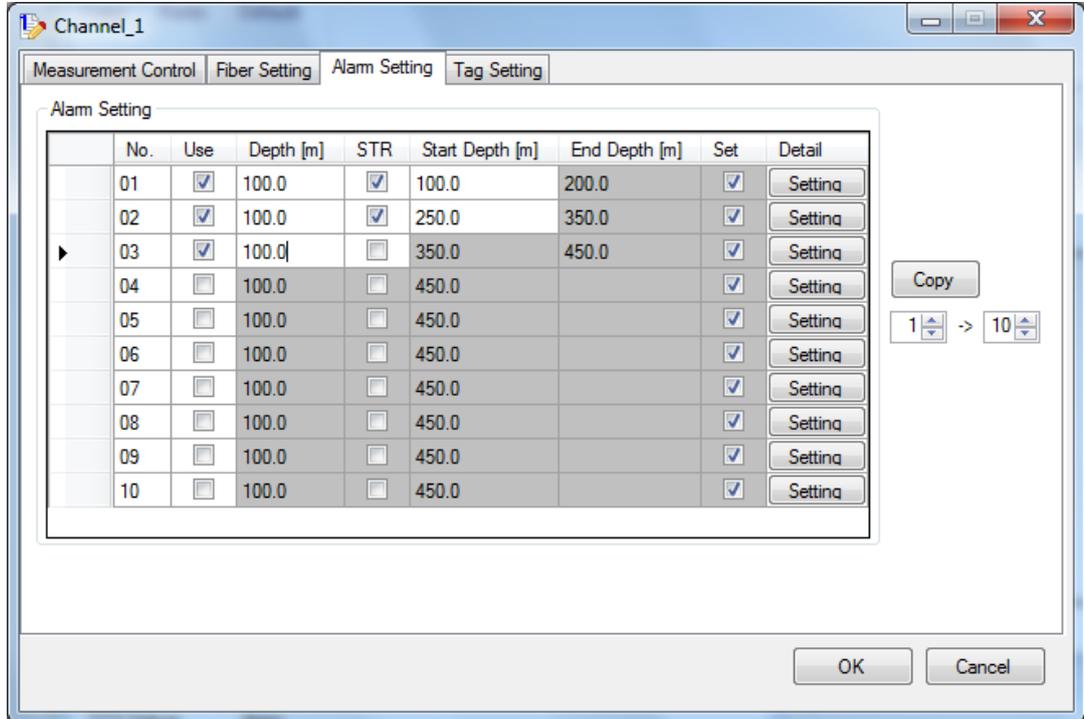
* Type M indicates a measurement-related setting.

TIP

- If an entered Hour or Minute value in the Start Time Table is invalid, an error provider is displayed at the beginning of the input row.
- When the focus is moved out of the Start Time Table, the start time values entered in the table are automatically sorted in ascending order.
- If a start time is repeated in the Start Time Table, the measurement sequence is executed only once at the start time.

5.6 Temperature Alarm Display

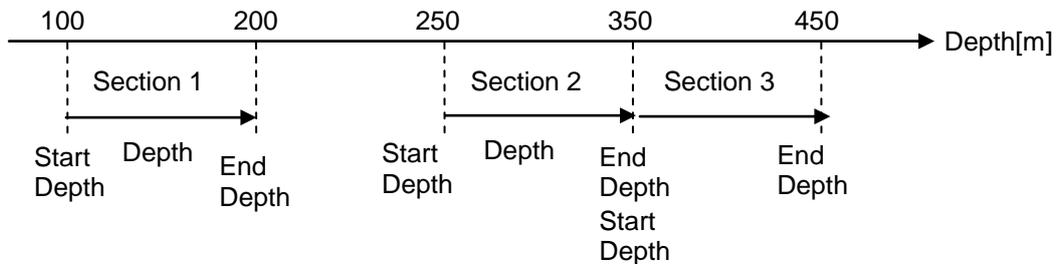
- Defining Alarms on Alarm Setting tab



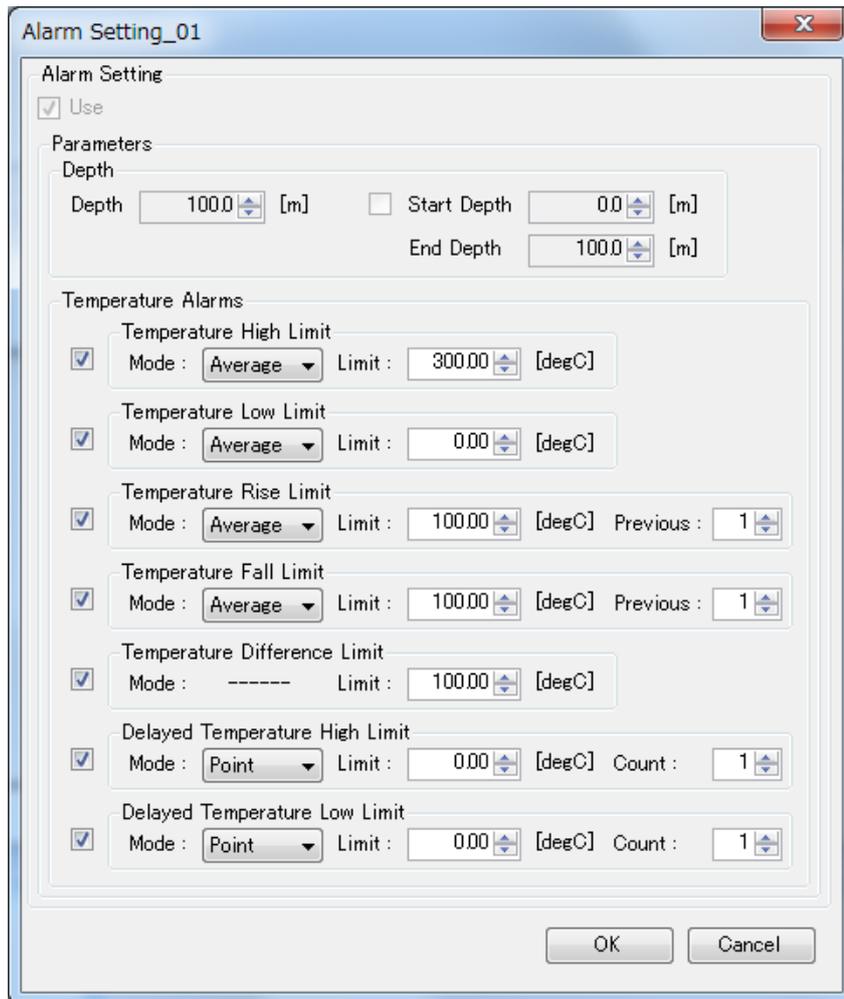
You can define up to 10 alarm sections for alarm detection.

Moreover, each alarm section can be enabled or disabled individually using a Use flag.

- Specify the Start Depth and Depth (distance from the Start Depth) for each alarm section.
- The Depth and Start Depth can be specified as any value from 0.1[m] to 30000.0 [m] with resolution of 0.1 [m].
- The End Depth is calculated automatically and thus need not be specified.
- When specifying contiguous alarm sections where the Start Depth of a section coincides with the End Depth of the previous section, you can save typing by deselecting the STR checkbox.
- If an entered Start Depth is before the End Depth of the preceding section, an error is reported is the entered value is rejected.



Clicking the [Setting] button in an alarm section row on the Alarm Setting tab window displays the following pop-up dialog window for detailed configuration of the alarm section.



Each of the 7 available alarm types can be enabled or disabled individually for each individual alarm section. The table below lists each alarm type along with the condition for alarm detection and the valid data range for specifying the alarm limit.

All alarm limit values can be specified with resolution of 0.01 [degC].

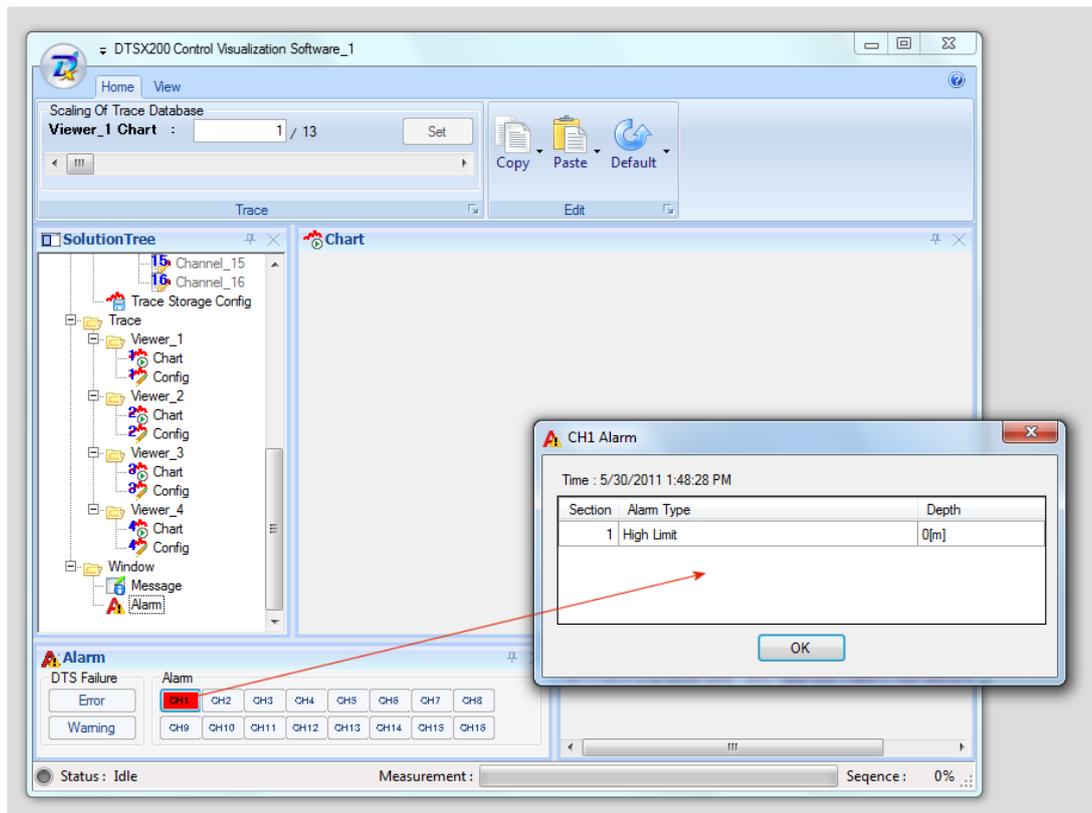
Alarm Type	Alarm Condition	Setting Range
Temperature High Limit	Measured value > Limit	-273.15 ≤ Limit ≤ 99999
Temperature Low Limit	Measured value < Limit	-273.15 ≤ Limit ≤ 99999
Temperature Rise Limit	(Measured value - n th preceding measured value) > Limit where n is specified by Previous	0 ≤ Limit ≤ 1273.14 0 ≤ Previous ≤ 10
Temperature Fall Limit	(n th preceding measured value - measured value) > Limit where n is specified by Previous	0 ≤ Limit ≤ 1273.14 0 ≤ Previous ≤ 10
Temperature Difference Limit	Difference between maximum and minimum measured values within section > Limit	-273.15 ≤ Limit ≤ 99999
Delayed Temperature High Limit	Measured value > Limit for n successive measurements where n is specified by Count	-273.15 ≤ Limit ≤ 99999 0 ≤ Count ≤ 10
Delayed Temperature Low Limit	Measured value < Limit for n successive measurements where n is specified by Count	-273.15 ≤ Limit ≤ 99999 0 ≤ Count ≤ 10

Except for the Temperature Difference Limit alarm type, you can select either of the following alarm modes for an alarm type:

- Select Point to report an alarm when any measured value within the section meets the alarm condition.
- Select Average to report an alarm when the average measured value of a section meets the alarm condition.

You can click the [Copy] button on the Alarm Setting dialog to copy the detailed alarm settings for any alarm No. to another alarm No.

● Temperature Alarm Display



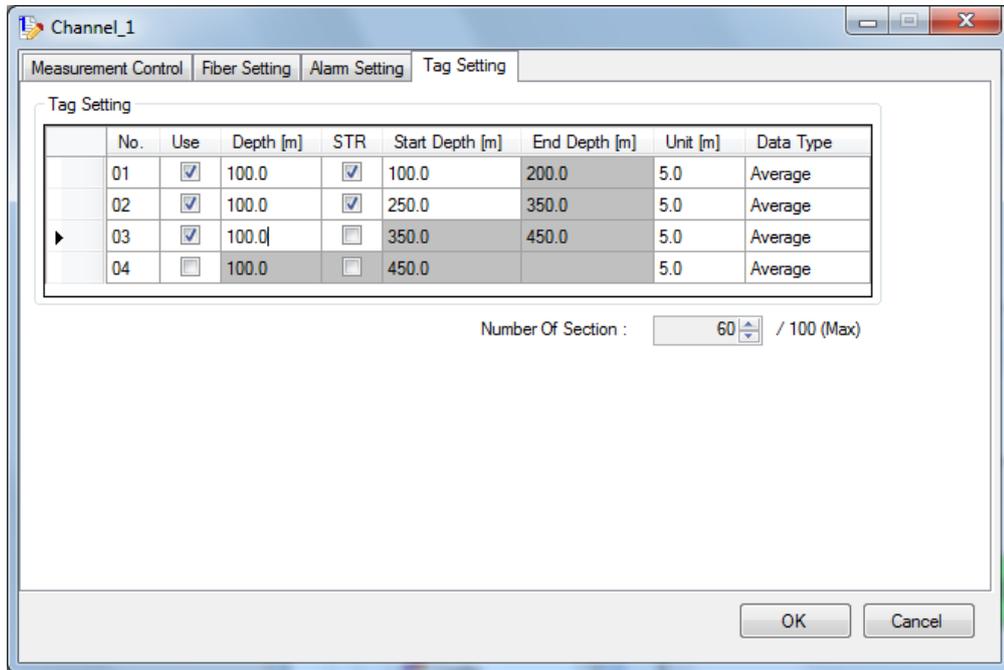
When any alarm condition is true, the corresponding alarm button for the channel in the Alarm window turns red. Clicking a red Alarm button opens a child window displaying information on the alarm section, alarm type and alarm position (Depth) for the detected alarm.

The table below describes what is displayed for the alarm position (Depth) when one or more alarms have been detected for a channel.

Alarm Type	Depth
An average-type alarm has been detected.	The Start Depth of the alarm section is displayed.
Both an average-type and a point-type alarm have been detected.	Point-type alarms have precedence over average-type alarms. The position nearest to the Start Depth of the alarm section is displayed.
A point-type alarm has been detected.	The position nearest to the Start Depth of the alarm section is displayed.

5.7 Data Compression Using Tag Setting

- Defining Tag Data Conditions

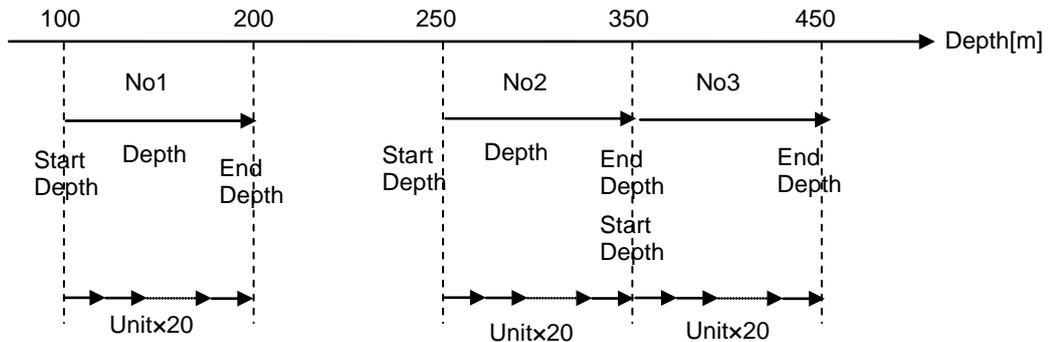


You can specify up to 4 sections for tag data compression.

- Specify the Start Depth and Depth (distance from the Start Depth) for each section.
- The End Depth is calculated automatically
- When specifying contiguous sections where the Start Depth of a section coincides with the End Depth of the previous section, you can omit the Start Depth.

Each section can be split by specifying a Unit provided that the total number of units in all sections does not exceed 100.

- Configuration is on section basis. The same data type is processed within one section.
- Processing result is generated and retrievable on unit basis.
- If the Depth of a section is not divisible by the specified Unit, the last section will be shorter than a unit. (For example, if Depth=100 [m] and Unit=30 [m], then the section will be split into 3 subsections of 30 [m] each and one last subsection of 10 [m].)



Any of the following five data types can be selected from the pull-down menu.

Tag Data Type	Unit	Processing
Average	degC	The average value of all measured values within a section is determined.
Maximum	degC	The maximum value of all measured values within a section is determined.
Minimum	degC	The minimum value of all measured values within a section is determined.
Difference	degC	The difference between the maximum and minimum measured values within a section is determined.
Slope	degC/m	Terms A, B, C, D and E of the least square method are determined.

Compressed tag data can be read via Modbus.
(Compressed tag data cannot be read using this software.)

SEE ALSO

For details, see description on Modbus/RTU and Modbus/TCP in Chapter B5, "Communication Functions" of the DTSX200 Guide (IM39J06B45-01E), along with the DTSX200 Communications (Modbus) Guide (IM39J06B45-02E).

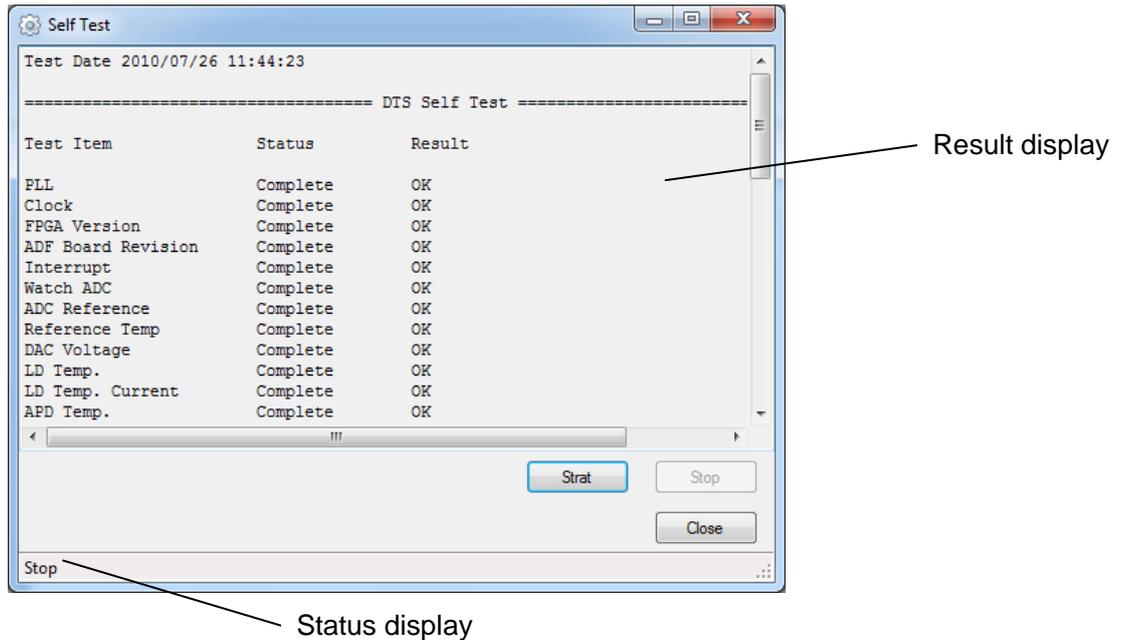
5.8 Self-Test

The DTSX200 provides a self-test function.

The Self Test dialog can be displayed by selecting Tool>Self Test in the main window.

TIP

- The Self Test dialog can also be displayed by double-clicking the Self Test node in the Solution Tree window.
- Self-test cannot be executed during measurement.



(1) Start button

Click [Start] to start self test.

(2) Stop button

Click [Stop] to abort self test.

(3) Close button

Click [Close] to close the Self Test dialog window.

(4) Result display

The self-test result display lists each test item along with its completion status (Completed or Not yet) and result (OK or NG).

(5) Status display

The status display shows the status of self-test execution.

Displayed Status	Description
Stop	Self-test not in progress.
Run	Self-test in progress.
Stop Preparation	Preparing to abort self-test.
Run Preparation	Preparing to execute self-test.

6. Monitoring Mode

6.1 Monitoring Mode Functions

The Monitoring mode is used for checking the measurement status of the DTSX200 and measurement results. Monitoring mode does not allow modification of measurement parameters of the DTSX200, measurement initiation and measurement termination, and thus protects against inadvertent modification during browsing and monitoring.

(1) Setting Measurement Parameters

Measurement parameters include measurement-related settings and calculation-related settings. The former is used for configuring measurement of Raman scatter signal levels while the latter is used for configuring temperature data calculation using measured signal level data.

The software supports recalculation of temperature data so any modification to calculation-related settings during measurement or after measurement completion is reflected in measurement result display.

TIP

- Any modification to calculation-related settings during measurement or after measurement completion is reflected only in measurement result display but not in saved measurement result data.
 - Measurement-related settings are for display only and cannot be modified in Monitoring mode.
-

(2) Saving Measurement Result Data

SEE ALSO

This function is the same as in Control mode. For details, see Section 5.1.

(3) Measurement Result Display

SEE ALSO

This function is the same as in Control mode. For details, see Section 5.1.

(4) Status Display

SEE ALSO

This function is the same as in Control mode. For details, see Section 5.1.

(5) Enabled and Disabled Functions

Individual functions of Monitoring mode may be enabled or disabled depending on the system status as shown in the table below.

Function	Window, Dialog or Button	System Status			
		Offline state	Online state		
			Connected to DTSX200		Disconnected from DTSX200
Measurement in progress	Measurement not in progress				
Setting measurement parameters	Sequence Setting dialog	O	Δ(*1)	Δ(*1)	Δ(*1)
	Channel Setting dialog (excluding Fiber Setting tab)	O	Δ(*1)	Δ(*1)	Δ(*1)
	Channel Setting dialog (Fiber Setting tab)	O	Δ(*1)	Δ(*1)	Δ(*1)
Saving measurement result	Trace Storage Config dialog	O	Δ(*1)	O	Δ(*1)
Measurement result display	Viewer Chart window	X	O	X (*3)	X (*3)
	Viewer Config dialog	O	O	O	O
Status display	Alarm window	X	O	O	X (*3)
	Message window	O	O	O	O
	Status bar (Measurement status display)	X	O	O	X
	Status bar (Connection status display)	O	O	O	O
Self-test execution	Self Test dialog	X	X	X	X

*1: Display only. No modification is allowed.

*2: Any modification to settings is reflected in measurement result display but not in saved measurement result data.

*3: Displays the status at the time of the last measurement.

O: Enabled

Δ: Enabled but with restrictions

X: Disabled

A disabled dialog cannot be displayed.

A disabled window is displayed but not updated.

A disabled button cannot be pressed.

7. Calibration Mode

7.1 Calibration Mode Functions

The Calibration mode provides a function for automatic detection of fiber connection points, an accessory function for fiber loss correction, and Wizards for temperature calibration. In addition, just as in control mode, the Calibration mode allows for setting of various measurement parameters of the DTSX200, as well as starting and stopping measurement by the DTSX200.

(1) Setting Measurement Parameters

SEE ALSO

This function is the same as in Control mode. For details, see Section 5.1.

(2) Starting and Stopping Measurement

SEE ALSO

This function is the same as in Control mode. For details, see Section 5.1.

(3) Saving Measurement Result Data

The software allows trace data (measurement result data) of the DTSX200 to be saved on a PC. Data saved to a PC can be retrieved in Trace mode after measurement completion.

TIP

- Time series data cannot be saved in Calibration mode.
 - Measurement result data can be saved only when the software is connected to the DTSX200. Measurement result data cannot be saved when the software is not running or when the software is disconnected from the DTSX200 due to communication error or some other reason.
-

(4) Measurement Result Display

Measurement result data of the DTSX200 can be displayed as charts.

TIP

- Time series charts cannot be displayed in Calibration mode.
 - Multiple charts cannot be displayed side by side in Calibration mode.
-

(5) Automatic Detection of Connection Points

Fiber connection points can be detected automatically in Calibration mode. This function is useful when multiple fiber segments are spliced together.

TIP

- Connection points may fail to be detected correctly when fiber connection points are close by, when reflection is excessive, when connection loss is extremely small or in other cases. If this happens, you need to adjust the detected connection points manually.
-

(6) Accessory Function for Fiber Loss Correction

The Stokes and Anti-Stokes signals of the Raman scatter suffer different fiber loss, which may result in temperature measurement error. Fiber loss correction to produce a horizontal temperature slope under constant temperature conditions is required. The Calibration mode provides a function for displaying an approximate straight line for the temperature distribution, which enables accurate and easy adjustment of the correction value.

(7) Status Display**SEE ALSO**

This function is the same as in Control mode. For details, see Section 5.1.

(8) Self-test**SEE ALSO**

This function is the same as in Control mode. For details, see Section 5.1.

(9) Enabled and Disabled Functions

Individual functions of Calibration mode may be enabled or disabled depending on the system status as shown in the table below.

Function	Window, Dialog or Button	System Status			
		Offline state	Online state		
			Connected to DTSX200	Measurement not in progress	Disconnected from DTSX200
Setting measurement parameters	Sequence Setting dialog	O	Δ(*1)	O	Δ(*1)
	Channel Setting dialog (excluding Fiber Setting tab)	O	Δ(*1)	O	Δ(*1)
	Channel Setting dialog (Fiber Setting tab)	O	Δ(*1)	O(*2)	Δ(*1)
Starting and stopping measurement	Start button	X	X	O	X
	Stop button	X	O	X	X
Saving measurement result	Trace Storage Config dialog	O	Δ(*1)	O	Δ(*1)
Measurement result display	Viewer Chart window	X	O	X (*3)	X (*3)
	Viewer Config dialog	O	O	O	O
Automatic detection of connection points	Fiber Connection Calibration dialog	X	X	Δ(*4)	X
Auxiliary function for fiber loss correction	Fiber Parameter Calibration dialog	X	X	Δ(*4)	X
Status display	Alarm window	X	O	O	X (*3)
	Message window	O	O	O	O
	Status bar (Measurement status display)	X	O	O	X
	Status bar (Connection status display)	O	O	O	O
Self-test execution	Self Test dialog	X	X	O	X

*1: Display only. No modification is allowed.

*2: Any modification to settings is reflected in measurement result display but not in saved measurement result data.

*3: Displays the status at the time of the last measurement.

*4: Enabled when measurement is not in progress and measurement result is displayed as charts.

O: Enabled

Δ: Enabled but with restrictions

X: Disabled

A disabled dialog cannot be displayed.

A disabled window is displayed but not updated.

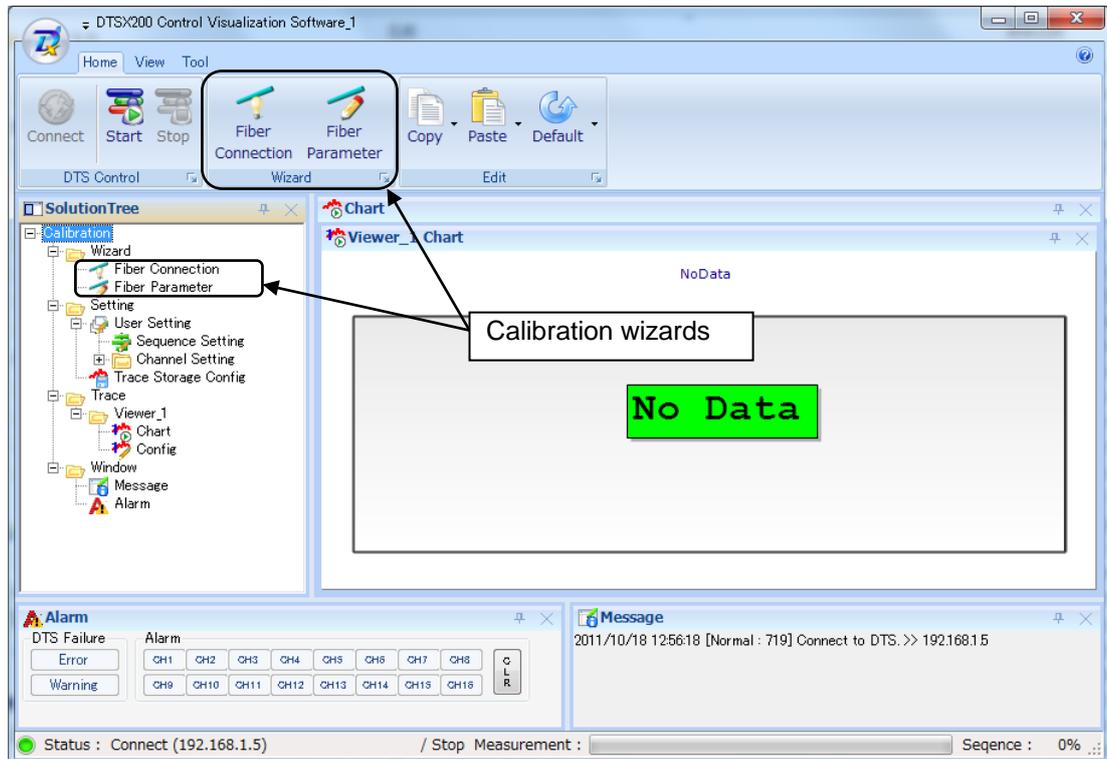
A disabled button cannot be pressed.

7.2 Automatic Connection Point Detection

Temperature calibration is required for each fiber section. The Calibration mode provides a function for automatic detection of fiber connection points. The procedure for fiber connection point detection is described below.

■ Run the software in calibration mode

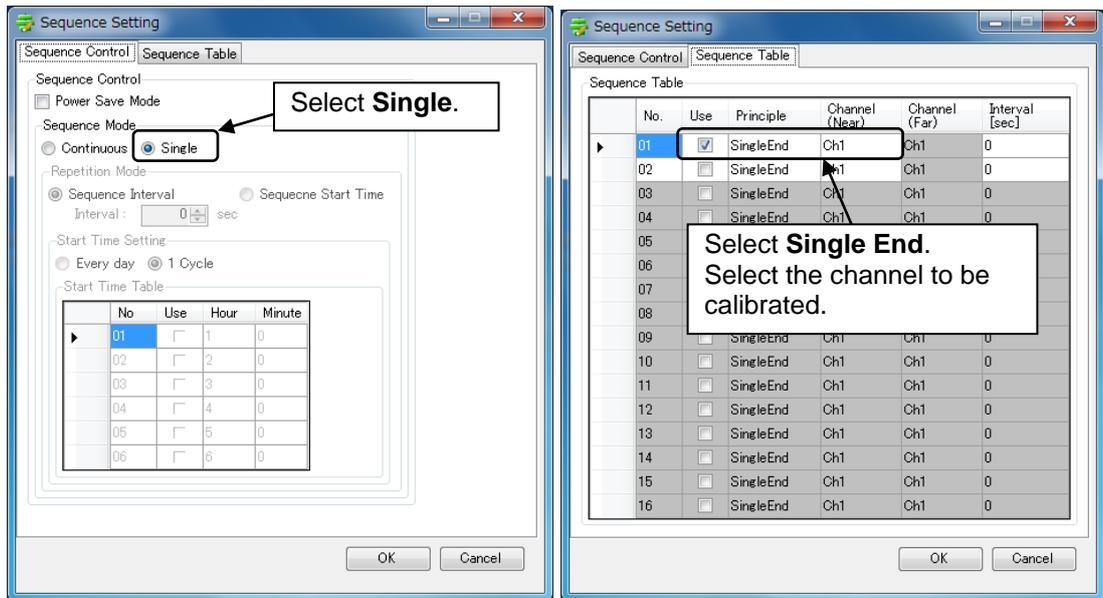
1. Run the DTSX200 Control Visualization Software in calibration mode. Calibration mode provides Wizards for accurate and simple temperature calibration.



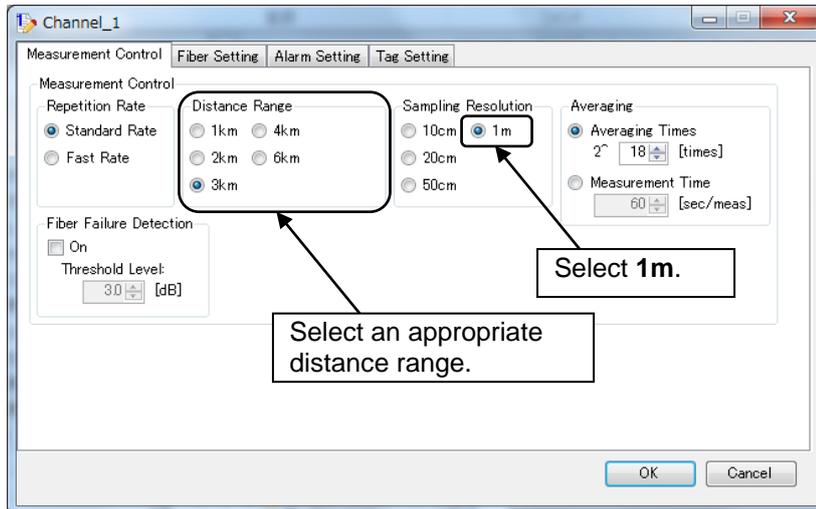
■ Prepare for measurement

Before running the Wizard for automatic detection of connection points, you need to temporarily configure the channel to be calibrated for single-ended measurement. To do so, display the Sequence Setting dialog and follow the procedure below:

2. Select Single for Sequence Mode on the Sequence Control tab.
3. Select the Use checkbox for a row on the Sequence Table tab.
4. On the row with the Use checkbox selected:
 - Select SingleEnd for Principle.
 - Select the channel to be calibrated for Channel(Near).
5. Click [OK]. The dialog closes.



Next, display the Channel_n dialog for the channel to be calibrated (where n denotes its channel number) and specify the channel settings as described below.



6. Select a range longer than the total fiber length for Distance Range on the Measurement Control tab.
7. Select 1m for Sampling Resolution on the Measurement Control tab.
8. Click [OK]. The dialog closes.

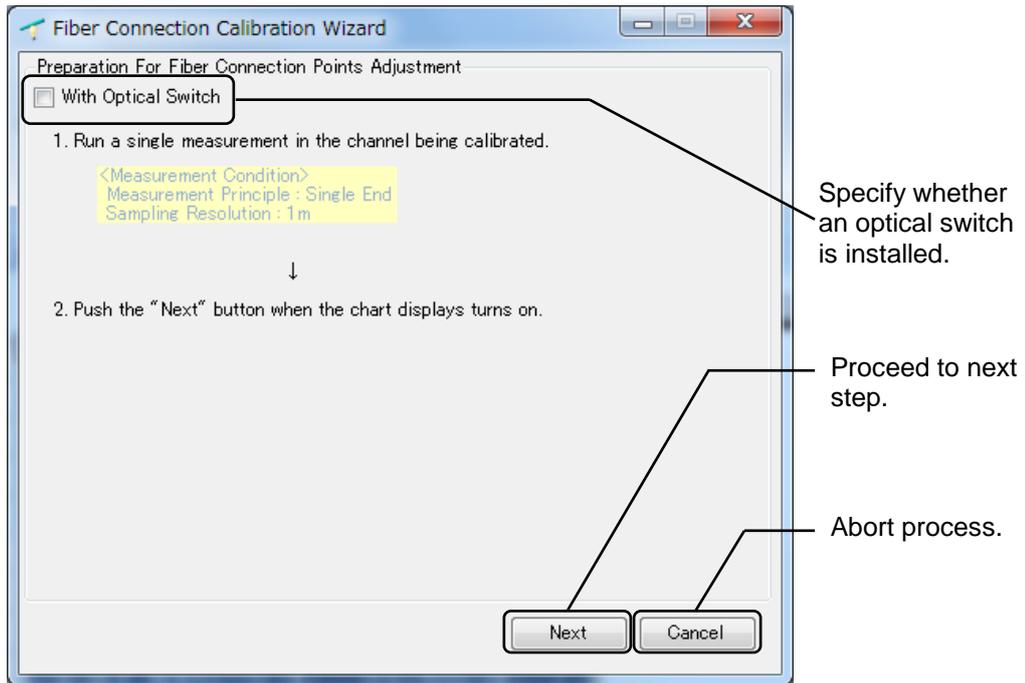
■ Measurement

9. After editing the settings, click the [Start] button on the Toolbar to start measurement.

■ Automatic connection point detection

10. After measurement ends and the measurement result is displayed, double-click on Fiber Connection in the Solution Tree window. The Fiber Connection Calibration Wizard runs.

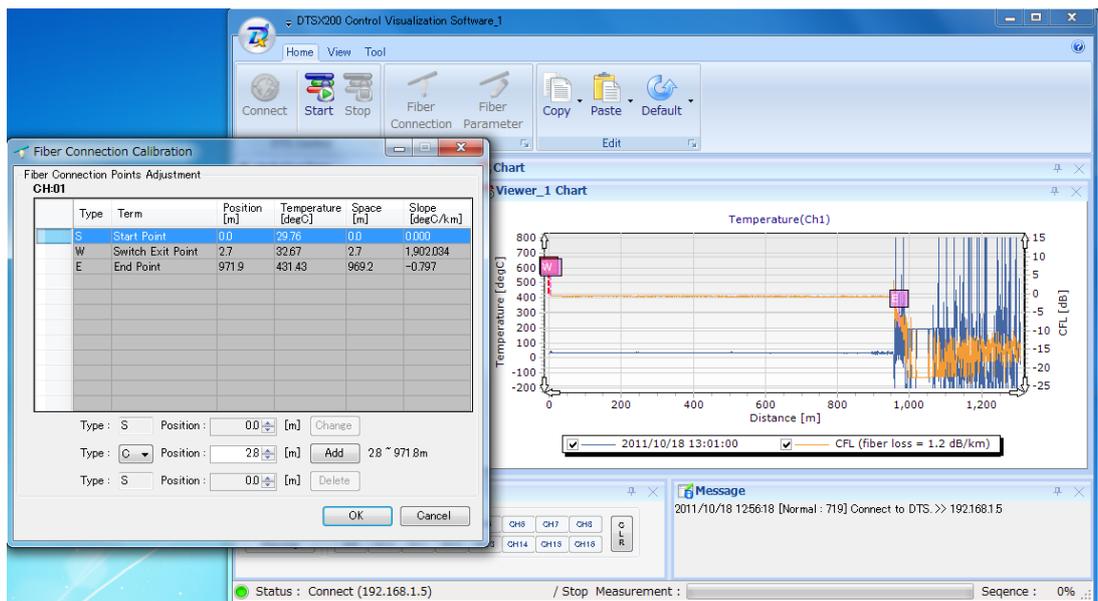
11. On the displayed dialog, specify whether an optical switch is installed or not by selecting or deselecting the With Optical Switch checkbox respectively.
12. Click [Next] to proceed or click [Cancel] to abort the process.



TIP

- The [Next] button is enabled only when measurement is not in progress and the measurement result is displayed in a chart.

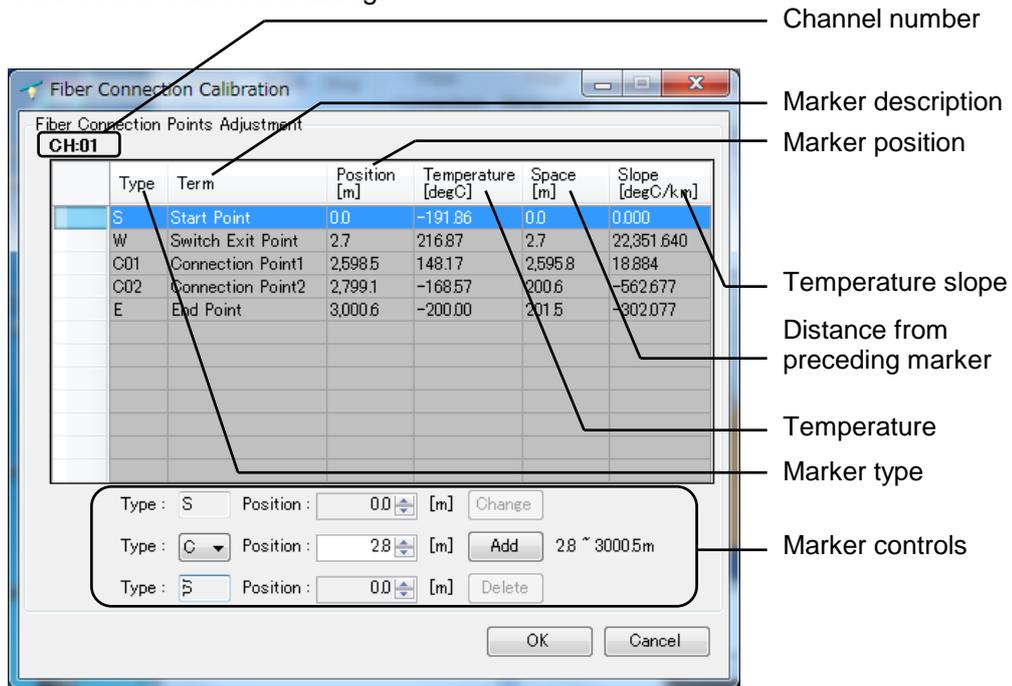
13. If you have clicked the [Next] button in the preceding step, automatic connection point detection begins. A CFL (Calculated Fiber Loss) waveform is displayed together with the temperature distribution in the chart. A marker is displayed at each detected connection point position. A list of the markers is also displayed in the Wizard dialog.



TIP

- The marker list displayed in the Wizard dialog is tied to the markers displayed in the chart.
- When automatic connection point detection is executed, the chart display switches automatically to Distance-Temperature and Distance-CFL.
- The chart display can be manipulated even when the Wizard dialog is displayed.
- The CFL waveform is obtained by eliminating the effect of temperature from Stokes signal levels. For more details on CFL, see Section 4.7.

The figure and table below describes the functions of the items displayed on the Fiber Connection Calibration dialog.



Display Item	Description
Channel number	Indicates the number of the channel being calibrated.
Type	S denotes the DTSX200 exit position. W denotes the switch exit position. C01 to C10 denotes a marker connection point. E denotes the fiber end position. (* Each marker type maps to a marker in the chart display.)
Term	Describes the marker.
Position	Indicates the position of a marker.
Temperature	Indicates the temperature at the marker position.
Space	Indicates the distance of a marker from the preceding marker.
Slope	Indicates the temperature slope between two markers.
Marker controls	Can be used to move, add or delete a marker.
[OK] button	Update Fiber Settings with the fiber connection point information and closes the Wizard dialog.
[Cancel] button	Closes the Wizard dialog without updating Fiber Settings with the fiber connection point information.

TIP

- If the End Point exceeds the specified distance range, an error provider is displayed at the top left corner of the marker list.

Type	Term	Position [m]
		0.0
W	Switch Exit Point	2.7
C01	Connection Point1	2,598.5
C02	Connection Point2	2,799.1
E	End Point	3,000.6

■ Adjust connection points

You may need to move, delete or add a connection point after automatic connection point detection when the position of a detected connection point is off, or a connection point is not detected or a detected connection point is not wanted. Markers can be moved, added or deleted in Calibration mode.

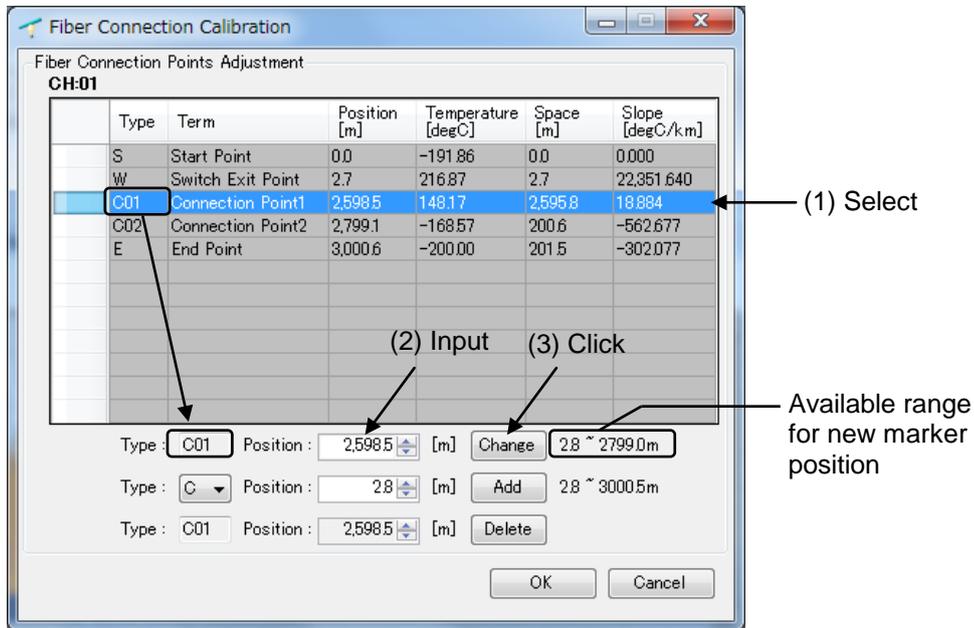
14. Adjust the connection points as required using the functions for moving, adding and deleting a marker.

TIP

- Markers can be moved, added or deleted in the Fiber Connection Calibration dialog or the Chart window.

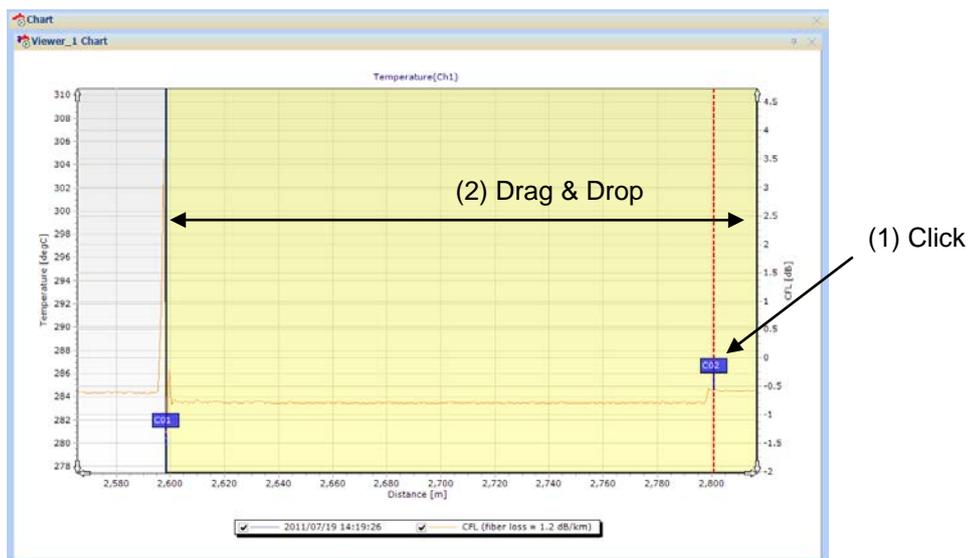
● **Moving a marker**

- To move a marker using the Fiber Connection Calibration dialog:
- (1) From the marker list, select the marker to be moved. The type of the selected marker is displayed in the Type field of the first row in the marker control area.
- (2) Enter the desired new marker position in the Position field of the first row in the marker control area.
- (3) Click the [Change] button. The marker is moved to the specified position.



- To move a marker using Chart window functions:

- (1) Click on the marker to be moved in the chart display.
A yellow band indicating the available range for a new marker position is displayed. At the same time, a red broken line appears at the current marker position.
- (2) Drag and drop the red line to the desired new marker position. The marker is moved to the new position.

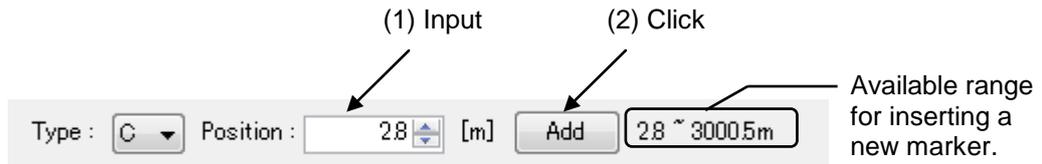


TIP

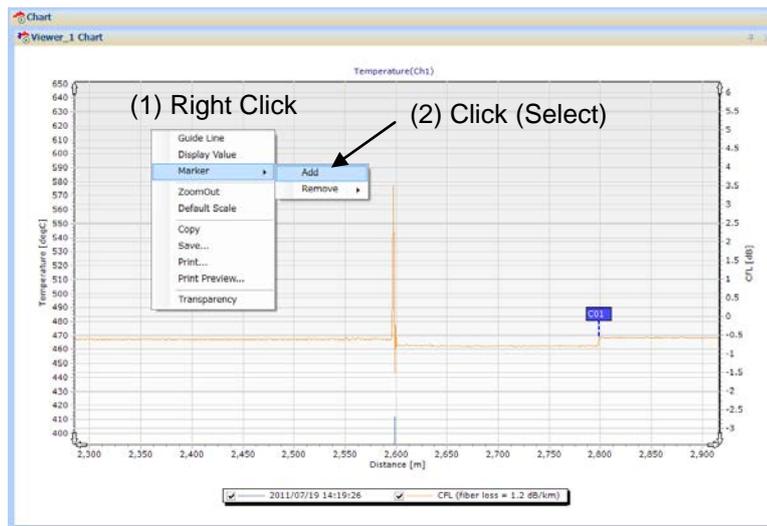
- The S marker cannot be moved.

● **Adding a marker**

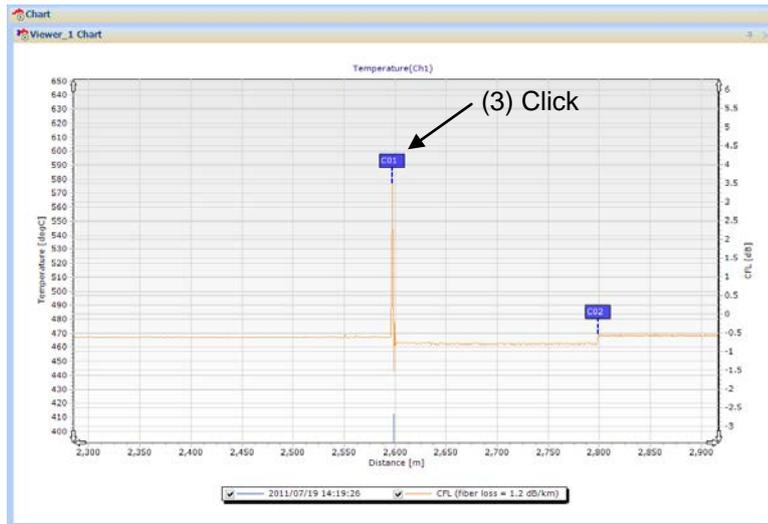
- To add a new marker using the Fiber Connection Calibration dialog:
 - (1) Enter the position for adding a marker in the Position field of the second row in the marker control area
 - (2) Click [Add]. A new marker is added at the specified position.



- To add a new marker using Chart window functions:
 - (1) Right-click on the chart display area to display a context menu.
 - (2) Select Marker>Add from the displayed context menu. A yellow band indicating the available range for inserting a new marker is displayed.
 - (3) Click on the desired position for adding a new marker on the CFL waveform in the chart display. A new marker is displayed at the clicked position.



Adding a marker



• Deleting a marker

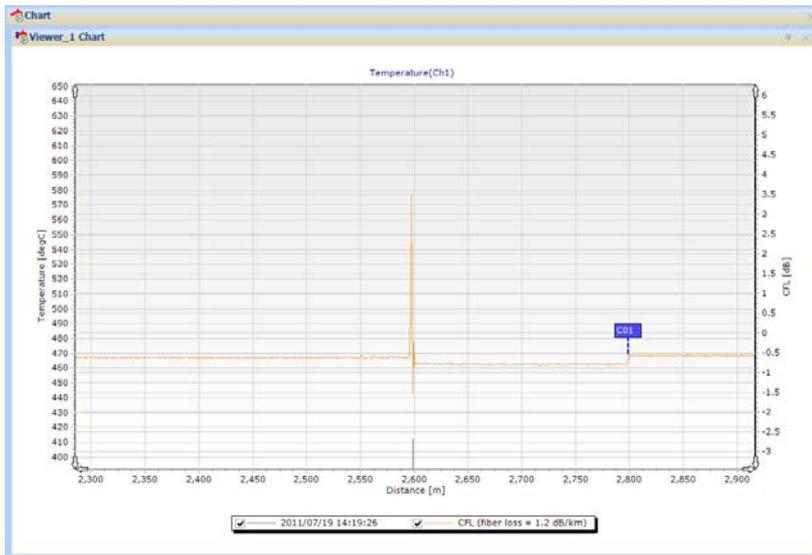
- To delete a new marker using the Fiber Connection Calibration dialog:
 - (1) From the marker list, select the marker to be deleted. The type and position of the selected marker is displayed in the Type and Position fields of the third row in the marker control area respectively.
 - (2) Click [Delete]. The selected marker is deleted.

Type	Term	Position [m]	Temperature [degC]	Space [m]	Slope [degC/km]
S	Start Point	0.0	-191.86	0.0	0.000
W	Switch Exit Point	2.7	216.87	2.7	22,351.640
C01	Connection Point1	2,598.5	148.17	2,595.8	18,884
C02	Connection Point2	2,799.1	-168.57	200.6	-562.677
E	End Point	3,000.6	-200.00	201.5	-302.077

- To delete a marker using Chart window functions:
 - (1) Right-click on the chart display area to display a context menu.
 - (2) Select Marker>Remove>Cnn from the displayed context menu.(nn denotes the type of the marker to be deleted.)The specified marker is deleted.

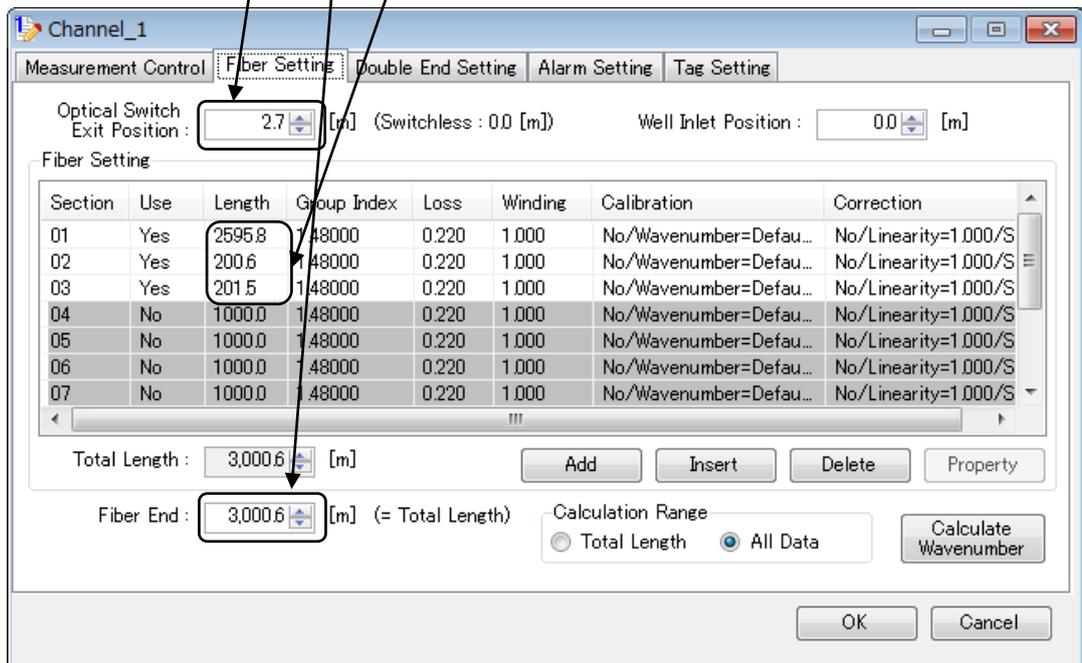
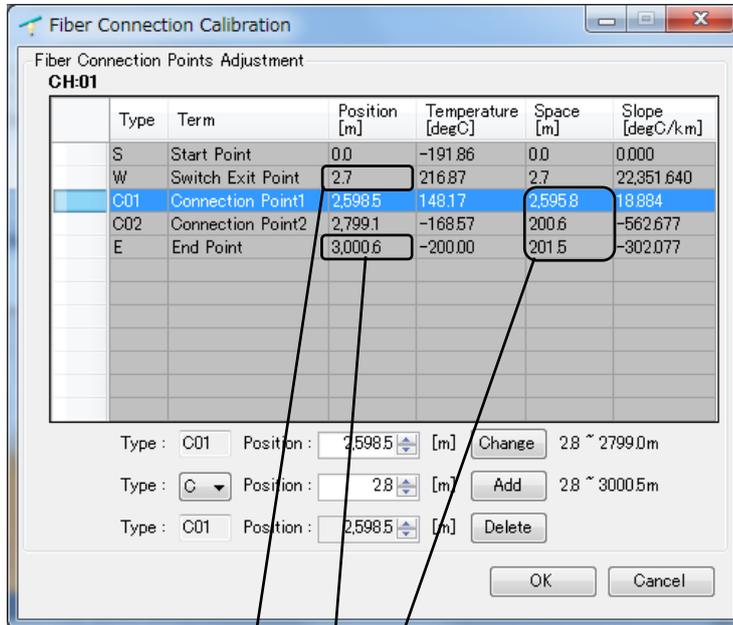


Deleting a marker



■ Update Fiber Settings with connection point information

- 15. Finally, click [OK] on the Fiber Connection Calibration dialog. The fiber connection point information is updated to the Fiber Setting tab window of the Channel_n dialog. Fiber section definition is completed.



7.3 Temperature Calibration

After determining the fiber sections, you need to perform temperature calibration for each section. Although temperature calibration can be carried out similarly using channel settings, the calibration mode provides an accessory function for fiber loss correction and a chart update function to support proper and easy temperature calibration.

■ Measurement

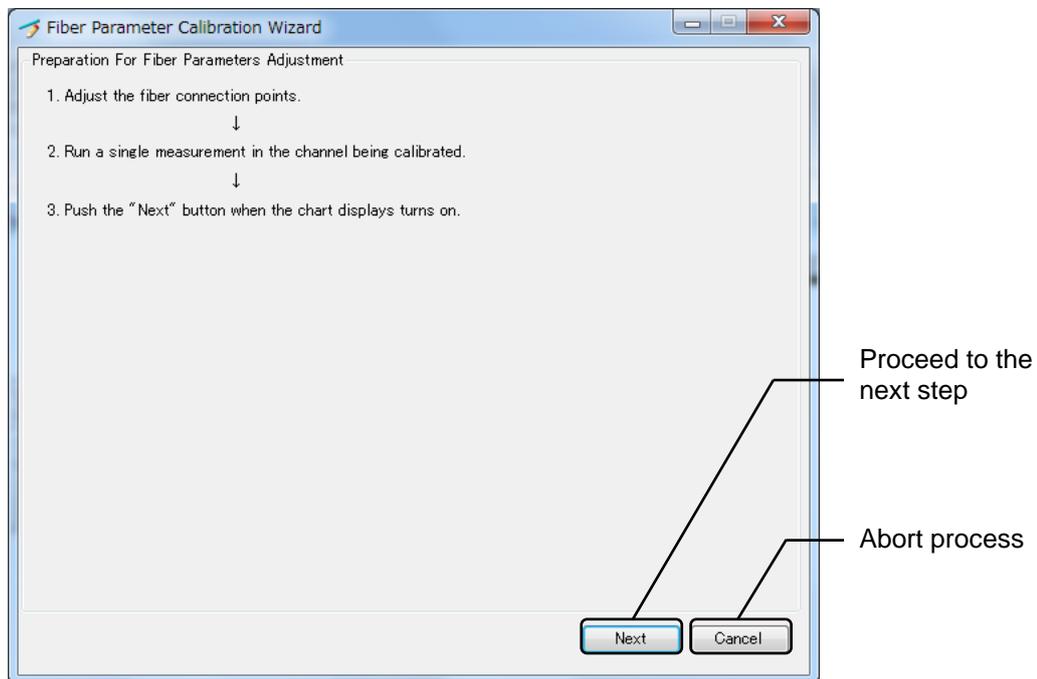
1. Before executing temperature calibration, you need to execute one measurement with temperature calibration disabled. Moreover, the measurement must be executed under the same measurement condition (single-ended or double-ended) to be calibrated.

TIP

- Unlike automatic connection point detection, which requires single-ended measurement to allow detection of the fiber end position, temperature calibration requires one measurement executed under the actual measurement condition.

■ Temperature calibration

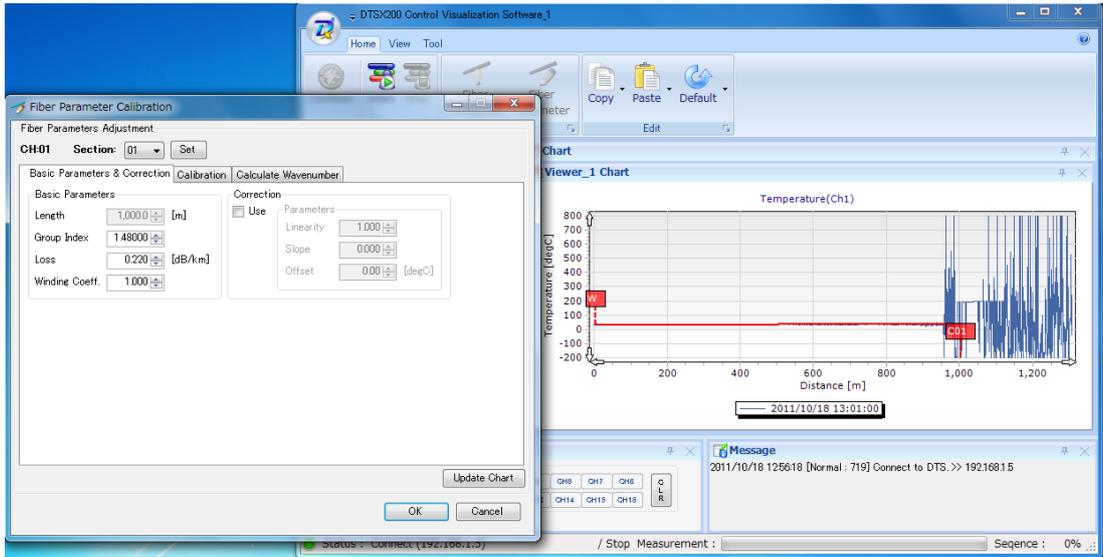
2. After measurement is completed and the measurement result chart is displayed, double-click on Fiber Parameter in the Solution Tree window. The Fiber Parameter Calibration Wizard dialog is displayed.
3. Clicking [Next] proceeds to the next step; Clicking [Cancel] aborts the process.



TIP

- The [Next] button is enabled only when measurement is not in progress and the measurement result is displayed in a chart.

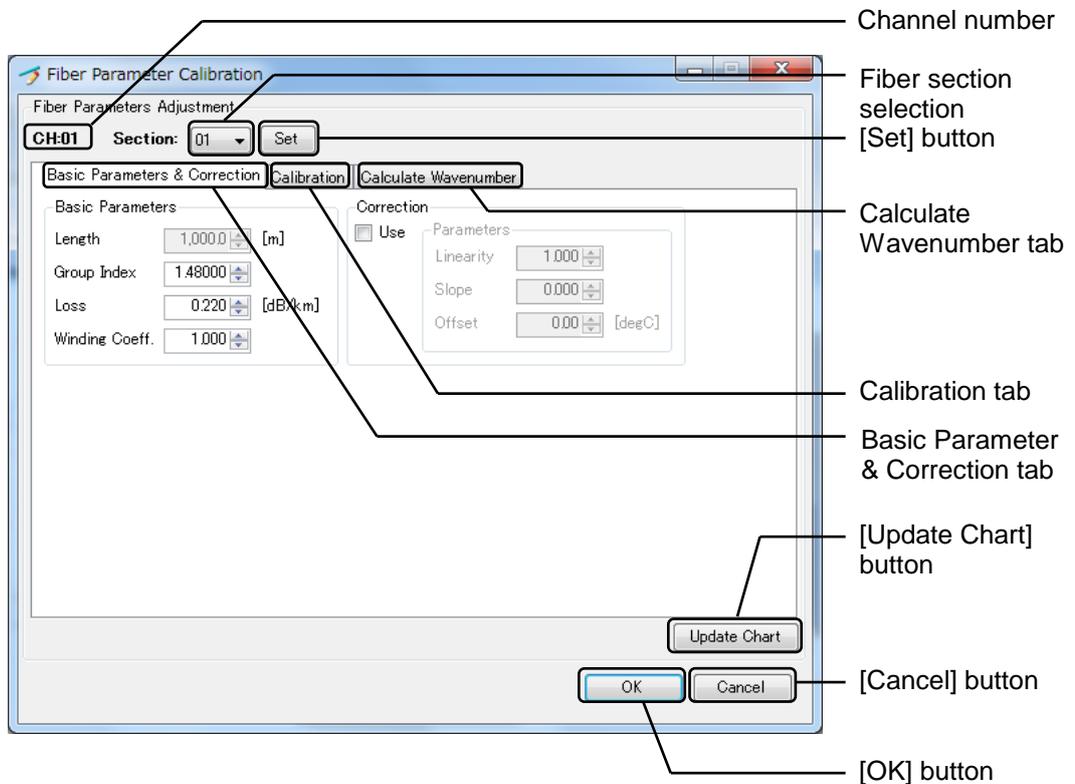
- Click [Next]. The Fiber Parameter Calibration dialog is displayed. Moreover, an approximate straight line (red line) of the temperature distribution is displayed in the chart display area.



TIP

- The chart display switches automatically to Distance-Temperature.
- The chart display can be manipulated even when the Fiber Parameter Calibration dialog is displayed.

The figure and table below describe the functions of the items displayed on the Fiber Parameter Calibration dialog.



Display Item	Description
Channel number	Displays the number of the channel to be calibrated.
Section	Select a fiber section.
[Set] button	Updates window display with the settings of the selected fiber section.
Basic Parameter & Correction tab	Select this tab to specify settings for basic parameters and temperature correction parameters.
Calibration tab	Select this tab to specify parameters for temperature calibration.
Calculate Wavenumber tab	Select this tab to calculate wavenumber.
[Update Chart] button	Updates chart display with edited settings.
[OK] button	Updates fiber settings with the specified parameters and closes the dialog.
[Cancel] button	Closes the dialog without updating fiber settings with the specified parameters.

TIP

-
- The Length displayed on the Basic Parameter & Correction tab is read-only and cannot be modified.
-

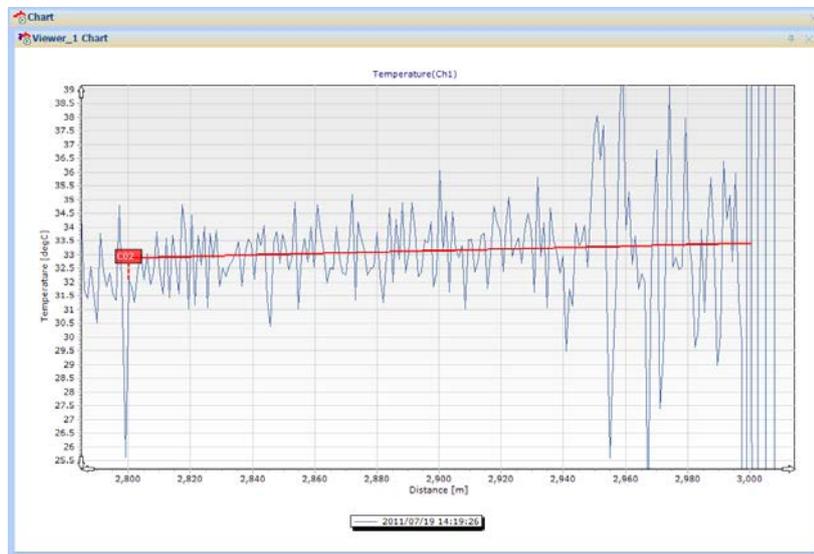
● **Fiber loss correction**

The DTSX200 calculates temperature using the Stokes and Anti-stokes signal level ratio. This introduces a temperature error due to the difference in fiber transmission loss between the two signals. To correct this temperature error, you need to adjust the Loss value displayed on the Basic Parameter & Correction tab. The Loss here refers to the differential fiber transmission loss per unit length between the Stokes light and Anti-Stokes light. The Loss parameter has unit dB/km and is related to the temperature slope. The procedure for fiber loss correction is described below.

1. Select the fiber section to be calibrated from the pull-down menu of the Section field on the Fiber Parameter Calibration dialog and click the [Set] button.



An approximate straight line for the temperature distribution of the selected fiber section is displayed.

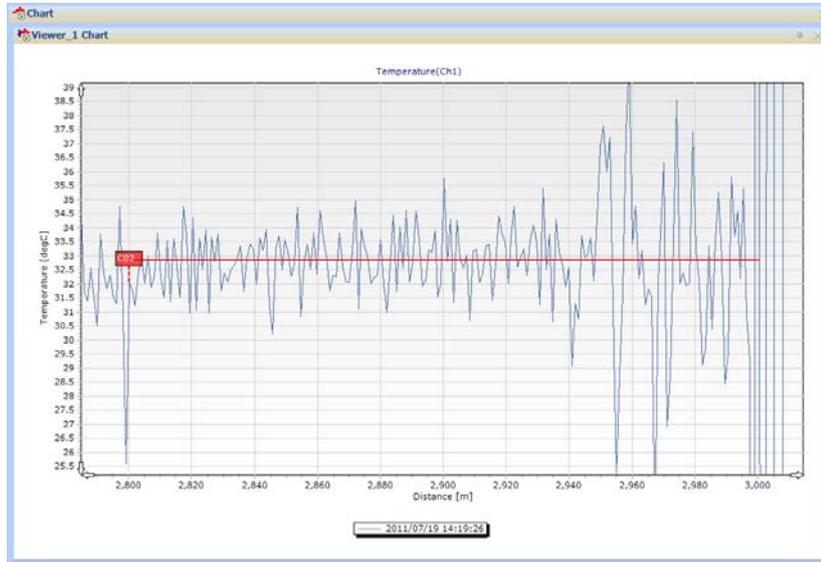


2. Modify the Loss value and click [Update Chart]. The temperature distribution and approximate straight line display is updated using the new Loss value. Repeat this step until the desired temperature slope is achieved.
3. Repeat steps 1. to 2. for each fiber section.

TIP

- If double-ended measurement, the measurement results in the forward direction and reverse direction are combined . This offsets any differential loss so loss correction is not required for double-ended measurement.
- In a constant temperature environment such as a constant temperature reservoir, adjust the Loss value until the temperature slope of the approximate straight line is horizontal.

Example: Horizontal temperature slope achieved through loss adjustment



- If each fiber section is installed with two thermometers at two different positions, you can also adjust fiber loss using real thermometer temperature readings by modifying the Loss value to make the displayed temperature slope coincide with the temperature slope between the two thermometer readings.

● **Temperature Calibration**

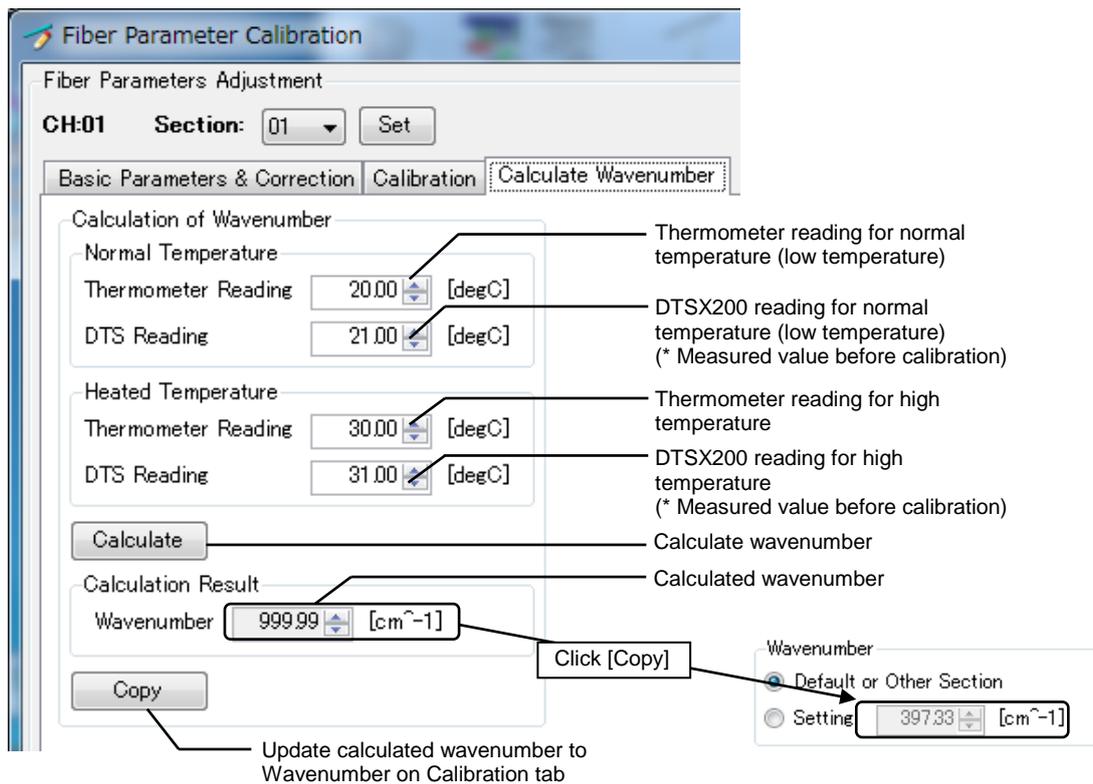
Temperature values depend on the wavenumber (unit: cm-1). The wavenumber parameter is related to the temperature scale factor. To determine the real wavenumber, thermometer readings and DTS readings (measured temperature values) at two different positions are required.

TIP

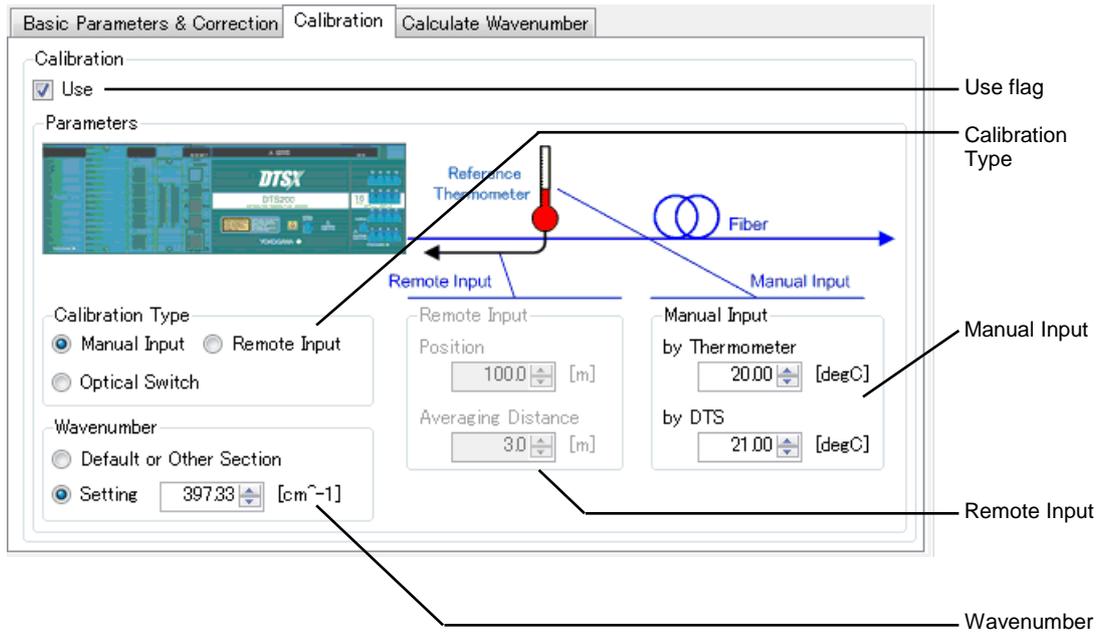
- We recommend to maximize the temperature difference between the two positions for better temperature calibration.
- Fiber loss correction must be done correctly for the distance between two different positions. Moreover, no fiber connection point must be present between the two different positions.
- Wavenumber can also be calculated using measured data values for two different temperatures at the same position.

The procedure for temperature calibration is given below. First, configure the software to calculate the real wavenumber.

1. Select the Calculate Wavenumber tab.
2. Enter the thermometer reading and DTSX200 reading for a normal temperature value (low temperature) in the Normal Temperature section. Next, enter the thermometer reading and DTSX200 reading for a high temperature value in the Heated Temperature section.
3. Click [Calculate] . The wavenumber is calculated and updated to Wavenumber of the Calculation Result group box.
4. Click [Copy]. The calculated result is updated to Setting of the Wavenumber group box on the Calibration tab.



5. To enable the wavenumber, select the Use checkbox on the Calibration tab window and select the Setting option for Wavenumber.



Display Item	Function
Use flag	Select this checkbox to enable temperature calibration.
Calibration Type	Select the Calibration type.
Manual Input	Select this option to enable the Manual Input group box and use its settings for calibration.
Remote Input	Select this option to enable the Remote Input group box and use its settings for calibration.
Optical Switch	Select this option to use settings stored in the optical switch memory for calibration. * This option can only be selected for the first fiber section. * If this option is selected but no optical switch is installed, temperature calibration is not performed.
Wavenumber	This group box selects and defines the wavenumber to be used for temperature calculation.
Default or Other Section	Select this option to use the default wavenumber value or the wavenumber value specified for other fiber sections. * If wavenumber is specified for multiple fiber sections, their average value is used.
Setting	Select this option to use the specified wavenumber value.
Remote Input	Select this option to calibrate DTSX200 temperature measurement using data at a specified position.
Position	Specify the position for temperature calibration.
Averaging Distance	Specify the distance in meters centered at the specified position to be used for averaging.
Manual Input	Select this option to calibrate DTSX200 temperature measurement using an actual thermometer temperature reading (temperature offset calibration).
Thermometer Reading	Specify the thermometer temperature reading (actual value).
DTS Reading	Specify the DTSX200 temperature measurement reading.

Next, perform temperature offset correction. Fiber connection loss occurs at the optical switch and fiber connection points. Connection loss also differs between Stokes light and Anti-Stokes light so it is necessary to perform temperature offset correction for each fiber section.

6. Select Manual Input, Remote Input or Optical Switch for Calibration Type. (* If Manual Input is selected, the Manual Input group box is enabled. If Remote Input is selected, the Remote Input group box is enabled. If Optical Switch is selected, both the Manual Input and Remote Input group boxes are disabled.)
7. If Manual Input is selected, specify a thermometer reading and a DTSX200 reading. The DTSX200 reading is calibrated using the thermometer reading as the true value. If Remote Input is selected, enter values for Position and Averaging Distance. DTSX200 temperature measurement will be calibrated using thermometer readings and DTSX200 readings at the specified position. If Optical Switch is selected, settings stored in the optical switch memory are used for calibration. The Optical Switch option, however, can only be selected for the first fiber section.
8. Click [Update Chart]. Temperature calibration is executed and the result updated in the chart display.
9. Next, perform temperature calibration similarly for the other sections. However, if fibers from the same lot are used, the wavenumber value is normally similar so once you have specified the wavenumber for one fiber section, you can select the Default or Other Section option for the other sections.

TIP

- DTSX200 measured temperature values used for temperature calibration must be pre-calibration values.

● **Temperature Correction**

Although we recommend performing fiber loss correction and temperature calibration using the procedures described earlier, you can also perform simple temperature correction using the Correction function.

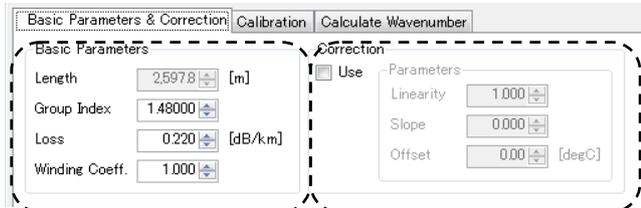
The screenshot shows a dialog box titled "Correction". It contains a "Parameters" section with three input fields: "Linearity" with a value of 1.000, "Slope" with a value of 0.000, and "Offset" with a value of 0.00 and a unit label "[degC]". A "Use" checkbox is checked.

Display	Function
Use	Select this checkbox to enable temperature correction.
Linearity	This parameter relates to the temperature scale.
Slope	This parameter relates to the temperature slope. (* It represents the temperature change [degC] per 100 meters.)
Offset	This parameter relates to the temperature offset.

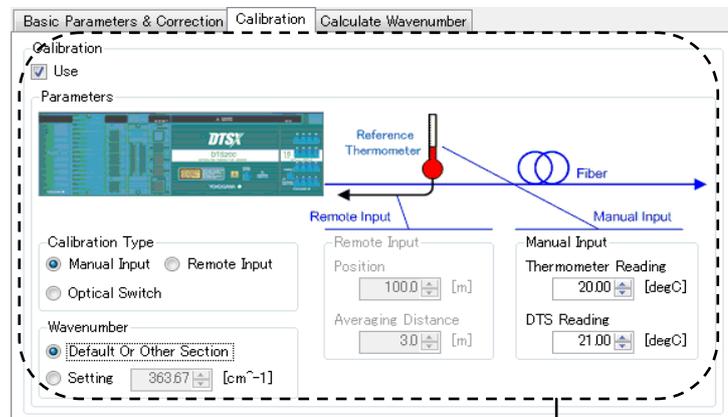
■ Updating to Fiber Settings

After completing temperature calibration, click the [OK] button on the Fiber Parameter Calibration dialog. The calibrated settings are updated to the Fiber Setting dialog. The calibrated settings can now be used to perform measurement in calibration mode. Moreover, the calibrated settings, once saved, can also be loaded and used in control mode.

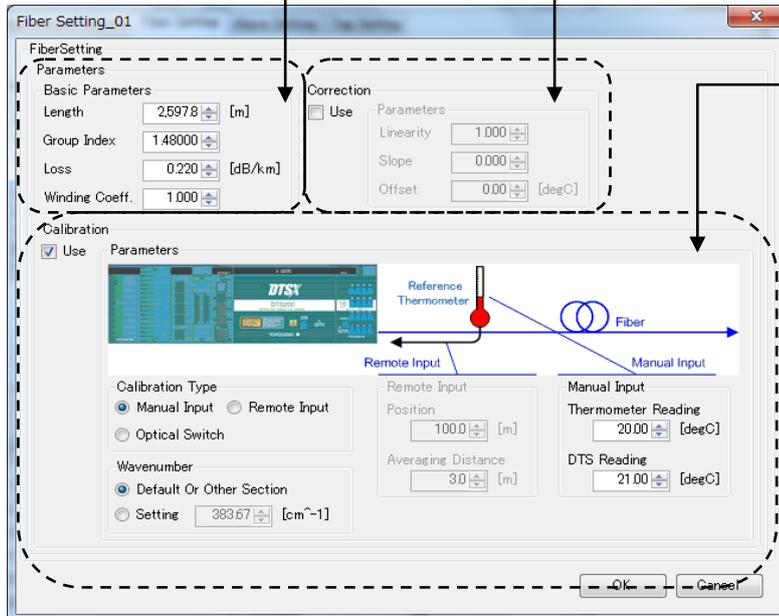
Basic Parameter & Correction tab of the Fiber Parameter Calibration dialog



Calibration tab of the Fiber Parameter Calibration dialog



Fiber Setting_nn dialog (where nn denotes a fiber section number)



8. Trace Mode

8.1 Trace Mode Functions

The Trace mode is used for checking measurement results after measurement completion.

TIP

The following terms will be used hereafter:

- Trace data refers to measurement result data.
 - Trace file refers to a file containing trace data.
 - Trace folder refers to a folder storing trace files.
 - For information on the trace file and folder structure, see Section 5.2.
-

(1) Loading Measurement Results

You can specify a trace folder or a trace file to be loaded.

- Specifying a trace folder for loading
 - You can specify a trace folder to load all trace files below the folder in one go and then specify the location of the trace file to be displayed when displaying measurement results.
 - If a time series data file is present, time series data is also loaded so time series chart display can be selected in measurement result display.
- Specifying a trace file for loading
 - If you specify a trace file for loading, only the specified trace file is loaded.
 - Time series chart display cannot be selected in measurement result display.

(2) Setting Measurement Parameters

Measurement parameters include measurement-related settings and calculation-related settings. The former is used for configuring measurement of Raman scatter signal levels while the latter is used for configuring temperature data calculation using measured signal level data.

The software supports recalculation of temperature data so any modification to calculation-related settings is reflected in measurement result display.

TIP

- Any modification to calculation-related settings is reflected only in measurement result display but not in trace folders or trace files.
 - Measurement-related settings are for display only and cannot be modified in trace mode.
-

(3) Measurement Result Display

Loaded trace data can be displayed as charts.

(4) Status Display

Status display functions include DTSX200 status display and software status display.

- DTSX200 status display
 - Alarm window:
 - Displays status information on temperature alarms detected by the DTSX200 for the displayed trace data. (If multiple data sets are displayed in the measurement result display, the alarm status of the oldest data set is displayed.)
- Software status display
 - Message window:
 - Displays various errors and warnings detected by the software.

(5) Saving Measurement Result to CSV Format File

Loaded trace data can be converted and saved to a CSV formatted file.

The created CSV file, however, cannot be reloaded by the software.

(6) Enabled and Disabled Functions

The table below shows enabled and disabled functions in trace mode.

Function	Window, Dialog or Button	Status
		Offline state
Setting measurement parameters	Sequence Setting dialog	Δ(*1)
	Channel Setting dialog (excluding Fiber Setting tab)	Δ(*1)
	Channel Setting dialog (Fiber Setting tab)	O (*2)
Saving measurement result	Trace Storage Config dialog	Δ(*1)
Measurement result display	Viewer Chart window	O
	Viewer Config dialog	O
Status display	Alarm window	O(*3)
	Message window	O

*1: Display only. No modification is allowed.

*2: Any modification to settings is reflected in measurement result display but not in measurement result file.

*3: Displays the status for the displayed measurement result data.

O: Enabled

Δ: Enabled but with restrictions

X: Disabled

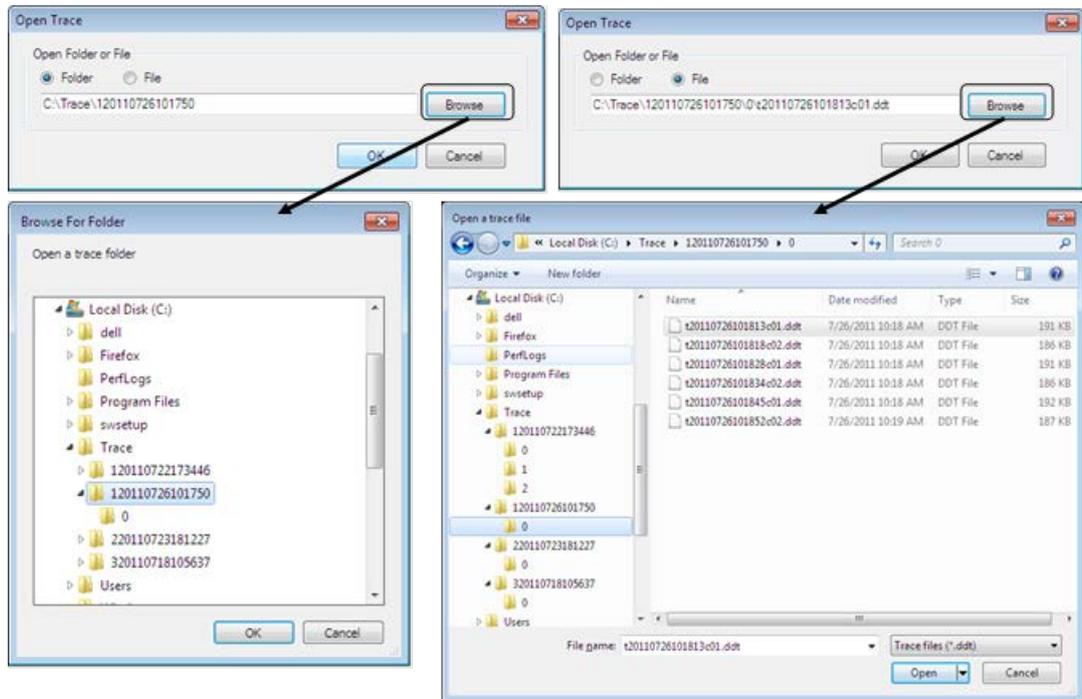
A disabled dialog cannot be displayed.

A disabled window is displayed but not updated.

A disabled button cannot be pressed.

8.2 Loading Trace Folder or Trace File

Run the software and select Trace on the Select Mode dialog. The Open Trace dialog is displayed.



Select whether to load a trace folder or a trace file, and then specify a folder name or file name to be loaded.

1. Select Folder or File.
2. If you have selected Folder, you can specify the folder to be loaded by:
 - Entering a folder name directly; or
 - Clicking the [Browse] button and selecting a folder on the displayed Browse For Folder dialog.
3. If you have selected File, you can specify the file to be loaded by:
 - Entering a file name directly; or
 - Clicking the [Browse] button and selecting a file on the displayed "Open a trace file" dialog.

The table below shows a sample trace folder/file structure.

Folder Structure	Description
C:\Trace	Destination for storing trace folder specified in Save Folder
<u>120110722173446</u>	Trace folder (created at the beginning of each measurement)
0	Trace file folder 0
1	Trace file folder 1
2	Trace file folder 2
<u>120110726101750</u>	Trace folder (created at the beginning of each measurement)
0	Trace file folder 0
<u>220110723181227</u>	Trace folder (created at the beginning of each measurement)
0	Trace file folder 0
<u>320110718105637</u>	Trace folder (created at the beginning of each measurement)
0	Trace file folder 0
1	Trace file folder 1
File Structure	Description
<u>120110722173446</u>	Trace folder (created at the beginning of each measurement)
UserSetup.dsu	Configuration file
InternalSetup.dsi	Configuration file
InitialInfo.ddi	Configuration file
TraceTimeseries0.ddr	Time series data file (for optical switch channel 1)
TraceTimeseries1.ddr	Time series data file (for optical switch channel 2)
0	Trace file folder 0
<i>120110726101813c01.ddt</i>	Trace file (measurement result file)
<i>120110726101818c02.ddt</i>	Trace file (measurement result file)
<i>120110726101828c01.ddt</i>	Trace file (measurement result file)
<i>120110726101834c02.ddt</i>	Trace file (measurement result file)
<i>120110726101845c01.ddt</i>	Trace file (measurement result file)
<i>120110726101852c02.ddt</i>	Trace file (measurement result file)

Bolded text indicates a folder name.

Shaded text indicates a file name.

Underlined text indicates a trace folder name which can be specified for loading in Trace mode.

Italicized text indicates a trace file name which can be specified for loading in Trace mode.

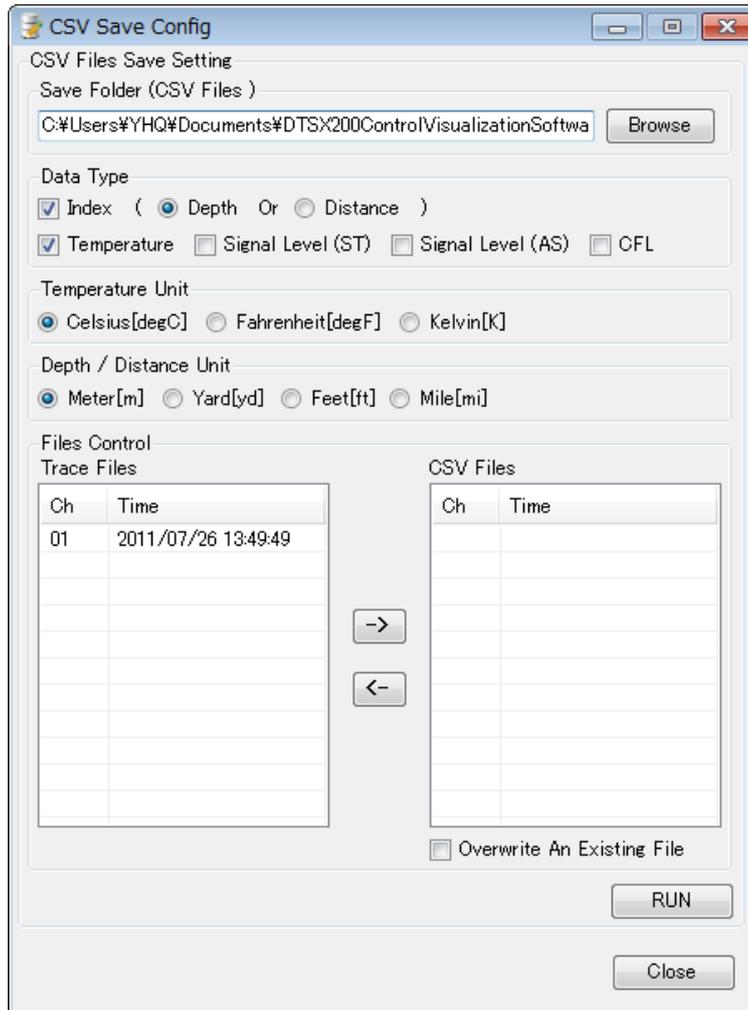


IMPORTANT

- When specifying a trace folder or trace file to be loaded, you must select one of the loadable locations shown in the above table. Otherwise, loading may fail or an error may occur after loading.
- Do not change the structure or names of subfolders and files below a trace folder. Otherwise, data loading by the software may fail or an error may occur after loading.
- Always specify a trace folder when copying or deleting trace data. Loading by the software will fail if only subfolders or files under a trace folder are copied.
- Do not modify the content of configuration files, time series data files and trace files. Otherwise, data loading by the software may fail or an error may occur after loading.

8.3 Saving to CSV File

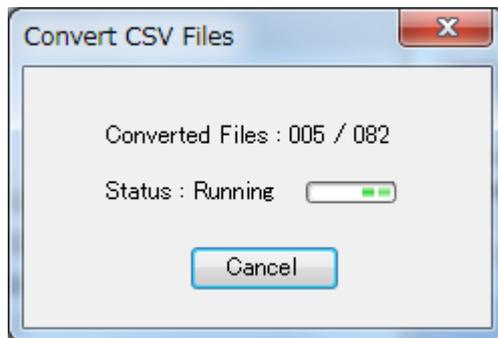
Trace data can be converted to CSV format and saved in a file using the CSV Save Config dialog.



On the CSV Save Config dialog, specify a destination folder for saving CSV files, the data types to be converted, the temperature unit, the distance unit, the trace files to be converted and whether to overwrite an existing file having the same name during saving. Click the [RUN] button to begin CSV file conversion.

1. In the Save Folder (CSV File) field, specify a folder for storing converted CSV files. An error will be reported if the specified folder does not exist.
2. In the Data Type group box, specify the data to be converted as follows:
 - To output distance parameters, select the Index checkbox.
 - If you have selected the Index checkbox, select Depth or Distance.
 - Select one or more of the Temperature, Signal level (ST), Signal level (AS) and CFL checkboxes as data types to be output. Conversion is not allowed if none of these four checkboxes are selected.
3. Specify the temperature unit for the output data by selecting Celsius[degC], Fahrenheit[degF] or Kelvin[K] for Temperature Unit. This setting applies to the Temperature data type.

4. Specify the depth/distance unit for output data by selecting Meter[m], Yard[yd] or Feet[ft] for Depth/Distance Unit. This setting applies to the Depth and Distance data types.
5. Under File Control, specify the trace files to be converted as follows:
 - From the Trace Files list displayed on the left, select a file to be converted and click the [->] button. The selected file is added to the CSV Files list on the right.
 - To remove a file from the CSV Files list of files to be converted, select the file and click the [-<] button.
 - By selecting or deselecting the Overwrite An Existing File checkbox, specify whether to overwrite an existing file in the specified destination folder having the same file name as a CSV file to be saved, if found.
6. Click the [RUN] button to initiate CSV file conversion. The following Convert CSV Files dialog is displayed to show the execution progress.



7. When CSV file conversion is completed, the Convert CSV Files dialog closes automatically.
8. Clicking the [Cancel] button during conversion aborts the conversion and closes the dialog.

TIP

- A converted CSV file has the same name as the original trace file but with file extension “.csv”.

Example:

- ✧ Trace file name: t20110126032134c01.ddt
- ✧ Display in Trace Files list: Ch:01/Time:2011/01/26 03:21:34
- ✧ CSV file name: t20110126032134c01.csv

- Converted CSV files cannot be loaded using this software.
- If CSV file conversion is aborted, CSV files created before the abort will remain undeleted in the destination folder.

Appendix A. Messages

A specific message may be displayed only in the Message window (see Section 4.8), only in dialogs or both. In addition, messages can be broadly classified into the following types.

Type	Description
Normal	Normal information
Error	An error has been detected (but the application can continue execution.)
FatalError	An error has been detected (and the application cannot continue execution.)
Warning	A warning has been detected (but the application can continue execution.)
Terminated	The application is terminated.



IMPORTANT

- If an Error type message is displayed, the application can continue execution but there may be some limitations on its operation thereafter.
 - If a FatalError type message is displayed, it will be followed by a “Terminated” type message and the application will be aborted.
-

Appendix A.1 List of Messages

- Normal messages

List of Normal Messages

No.	Type	Message	Description	Remedial Measures
0651	Normal	Cannot change setting, now! Please save.	A setting could not be changed. Settings cannot be changed during measurement in online state when in disconnected state.	- To keep current settings, save and then load the settings.
0652	Normal	Please define a "Sequence Table".	Measurement could not be started because sequence settings have not been defined.	- Define sequence settings. - See Section 5.3, "Single-ended Measurement" or Section 5.4, "Double-ended Measurement" for details.
0653	Normal	Setting isn't transmitted to DTS. Please save.	Measurement is not started after settings are modified so current settings are not updated to the DTSX200 and may be overwritten by old settings on the DTSX200 on subsequent connection to the DTSX200. Save the modified settings if necessary.	- To keep current settings, save the settings.
0713	Normal	Start Connect,	Reconnection was initiated because an error was detected during communication with the DTSX200.	- Check the error reported in the preceding message for the cause of reconnection.
0714	Normal	Cancel Connect	Connection with the DTSX200 was cancelled by a user.	-
0717	Normal	DTS was rebooted. It is reconnected.	Reconnection is made to the DTSX200 because the DTSX200 was rebooted.	- Check the DTSX200 message log for the cause of reboot.
0719	Normal	Connect to DTS.	Connection was made to DTSX200.	
0729	Normal	Connection with DTS went wrong. Click the Connect button and connect again.	Connection to DTSX200 has failed. Click the [Connect] button to connect again.	- Click the [Connect] button to connect again.

● Warning messages

List of Warning Messages

No.	Type	Message	Description	Remedial Measures
0102	Warning	The specified folder is not found.	The folder specified for Save Folder in the CSV Save Config dialog was not found.	- Check that the specified folder exists.
			The folder specified for Save Folder in the Trace Storage Config dialog was not found.	- Check that the specified folder exists.
			The folder specified for Open Folder Or File in the Open Trace dialog was not found.	- Check that the specified folder exists.
0103	Warning	There is no item in the conversion list.	No item for conversion has been added to CSV Files in the CSV Save Config dialog.	- Add at least one item to CSV Files and re-execute CSV conversion.
0104	Warning	The selection channel overlaps.	A channel is selected more than once in the Sequence Table of the Sequence Setting dialog.	- Modify the Sequence Table settings to remove the duplicate channel selection.
0105	Warning	No measurement channel is specified.	No channel for measurement is specified in the Sequence Table of the Sequence Setting dialog.	- Specify at least one channel for measurement in the Sequence Table.
0106	Warning	No data type is selected.	No data type for conversion is selected for Data Type in the CSV Save Config dialog.	- Select at least one data type for conversion in Data Type and then execute CSV conversion again.
0205	Warning	Trace Warning (Time series data file does not exist.)	In trace mode, time series data was not found in the specified trace folder. Chart display with time on the X axis is not allowed.	- This message is displayed if time series data was not saved at the time of measurement.
0208	Warning	Trace Warning (Failed to save file because a file of the same name exists.)	In trace mode, a converted CSV file could not be saved because a file of the same name was found.	- This message is displayed only if the option to overwrite an existing file is not selected.
0727	Warning	Some functions are unavailable for the connected DTS.	Some functions are unavailable as either the DTSX200 firmware or the DTAP200 software is not of the latest version.	Upgrade the firmware of the DTSX200, as well as the DTAP200 software, to the latest version.

● Error messages

List of Error Messages

No.	Type	Message	Description	Remedial Measures
0201	Error	Trace Error (Failed to load setting file.)	When in control, monitor or calibration mode, a settings file downloaded by DTSX200 could not be loaded.	<ul style="list-style-type: none"> - Check that no modification has been made to the file structure, folder structure or files in the trace folder. - Reboot the PC and re-execute measurement. - Reboot the DTSX200 and re-execute measurement. - Change the trace folder and re-execute measurement.
			When in trace mode, either the file structure of the specified trace folder is invalid or the content of a settings file is invalid.	<ul style="list-style-type: none"> - Check that no modification has been made to the file structure, folder structure or files in the trace folder. - Re-execute measurement and then load the acquired trace folder or file.
0202	Error	Trace Error (Failed to save csv file.)	In trace mode, a converted CSV file could not be saved.	<ul style="list-style-type: none"> - Check that no modification has been made to the file structure, folder structure or files in the trace folder. - Check that the destination folder for CSV files has sufficient free space. - Check that the destination folder for CSV files exists. - Change the destination folder for saving CSV files.
0203	Error	Trace Error (Failed to load data file.)	When in control, monitor or calibration mode, a trace file downloaded by DTSX200 could not be loaded.	<ul style="list-style-type: none"> - Check that no modification has been made to the file structure, folder structure or files in the trace folder. - Reboot the PC and re-execute measurement. - Reboot the DTSX200 and re-execute measurement. - Change the trace folder and re-execute measurement.
			When in trace mode, either the file structure of the specified trace folder is invalid or the content of a trace file is invalid.	<ul style="list-style-type: none"> - Check that no modification has been made to the file structure, folder structure or files in the trace folder. - Re-execute measurement and then load the acquired trace folder or file.
0204	Error	Trace Error (File or folder does not exist.)	When in trace mode, the specified trace folder or trace file was not found.	<ul style="list-style-type: none"> - Check that no modification has been made to the file structure, folder structure or files in the trace folder. - Check that the specified file or folder exists.
0206	Error	Trace Error (Failed to save timeseries file.)	When in control or monitoring mode, time series data files could not be saved at the end of measurement.	<ul style="list-style-type: none"> - Check that no modification has been made to the file structure, folder structure or files in the trace folder.

No.	Type	Message	Description	Remedial Measures
			If time series data is discontinuous because measurement by the DTSX200 is momentarily interrupted or trace file retrieval is discontinuous because the communication between this software and the DTSX200 is disconnected, only time series data preceding the discontinuity is stored.	<ul style="list-style-type: none"> - Reboot the PC and re-execute measurement. - Change the trace folder and re-execute measurement.
0207	Error	Trace Error (Failed to open measurement database.)	When in control, monitor or calibration mode, the specified trace folder was not found.	<ul style="list-style-type: none"> - Check that no modification has been made to the file structure, folder structure or files in the trace folder. - Reboot the PC and re-execute measurement. - Change the trace folder and re-execute measurement.
			When in trace mode, the specified trace folder or trace file was not found.	<ul style="list-style-type: none"> - Check that no modification has been made to the file structure, folder structure or files in the trace folder. - Check that the specified file or folder exists.
0209	Error	Trace Error (Failed to save setting file.)	When in control, monitor or calibration mode, settings files could not be saved at the beginning of measurement.	<ul style="list-style-type: none"> - Check that no modification has been made to the file structure, folder structure or files in the trace folder. - Reboot the PC and re-execute measurement. - Change the trace folder and re-execute measurement.
0210	Error	Trace Error (trace display overrun)	Update processing of chart display failed to keep up.	<ul style="list-style-type: none"> - Try terminating other applications running on the PC. - The processing power of the PC may be inadequate. Try switching to a more powerful PC.
0501	Error	Setup Error (Failed to load a setting.)	The specified settings file could not be loaded.	<ul style="list-style-type: none"> - Check that the file exists. - Check that software startup or exit is not in progress. - Check that measurement by DTSX200 is not in progress. - Save settings and check if the file can be loaded.
0502	Error	Setup Error (Failed to save a setting.)	The specified settings file could not be saved.	<ul style="list-style-type: none"> - Check that the file exists. - Check that software startup or exit is not in progress.
0503	Error	Setup Error (Failed to default a setting.)	The specified setting could not be initialized.	<ul style="list-style-type: none"> - Check that software startup or exit is not in progress. - Check that measurement by DTSX200 is not in progress.
0504	Error	Setup Error (Failed to copy a setting.)	The specified setting could not be copied.	<ul style="list-style-type: none"> - Check that software startup or exit is not in progress.
0505	Error	Setup Error (Failed to paste a setting)	The specified setting could not be pasted.	<ul style="list-style-type: none"> - Check that software startup or exit is not in progress. - Check that measurement by DTSX200 is not in progress. - Copy setting and check if the setting can be pasted.
0506	Error	Setup Error (Failed to change a setting.)	The specified setting could not be changed.	<ul style="list-style-type: none"> - Check that software startup or exit is not in progress. - Check that measurement by DTSX200 is not in progress.

No.	Type	Message	Description	Remedial Measures
0509	Error	Startup Error (Failed to get data from form.)	Setting(s) could not be retrieved from a displayed configuration dialog.	<ul style="list-style-type: none"> - Try re-running the software. - Try rebooting the PC. - Try reinstalling the software.
0511	Error	Form Error (Failed to open a form.)	A window or dialog could not be displayed.	<ul style="list-style-type: none"> - Try re-running the software. - Try rebooting the PC. - Try reinstalling the software.
0514	Error	Form Error (Failed to close a form.)	An error was detected during termination of a dialog.	<ul style="list-style-type: none"> - Try re-running the software. - Try rebooting the PC. - Try reinstalling the software.
0515	Error	Form Error (Failed to make a dialog)	A dialog could not be created.	<ul style="list-style-type: none"> - Try re-running the software. - Try rebooting the PC. - Try reinstalling the software.
0523	Error	Processing Error (Cannot connect to DTS.)	Connection to DTSX200 was aborted.	<ul style="list-style-type: none"> - Check that the DTSX200 is not connected. - The status display may be delayed.
0524	Error	Processing Error (Cannot start measurement.)	Measurement could not be started.	<ul style="list-style-type: none"> - Check that measurement is not already started. - Check that self test is not in progress. - Check that the DTSX200 is not disconnected. - The status display may be delayed.
0525	Error	Processing Error (Cannot stop measurement.)	Measurement could not be stopped.	<ul style="list-style-type: none"> - Check that measurement is not already stopped. - Check that self test is not in progress. - Check that the DTSX200 is not disconnected. - The status display may be delayed.
0531	Error	File Error (Failed to find a file.)	A file (manual, etc.) does not exist.	<ul style="list-style-type: none"> - Try reinstalling the software.
0532	Error	File Error (Failed to open a file.)	A file (manual, etc.) could not be opened.	<ul style="list-style-type: none"> - Install Acrobat Reader or some other PDF file browser software.
0543	Error	Calibration Error (Cannot calibrate)	Calibration could not be executed.	<ul style="list-style-type: none"> - Check that DTSX200 has stopped measurement. - Check that self test is not in progress. - Check that the DTSX200 is not disconnected. - The status display may be delayed.
0554	Error	Setup Error (Value is empty.)	No value is specified.	<ul style="list-style-type: none"> - Specify a value. - See parameter description in this manual for details.
0555	Error	Setup Error (Over max length.)	The specified character string is too long.	<ul style="list-style-type: none"> - Specify a string value not longer than the length limit. - See parameter description in this manual for details.
0557	Error	Setup Error (Over max value.)	The specified value is too large.	<ul style="list-style-type: none"> - Specify a value equal or smaller than the high limit. - See parameter description in this manual for details.
0558	Error	Setup Error (Under min value.)	The specified value is too small.	<ul style="list-style-type: none"> - Specify a value equal or larger than the low limit. - See parameter description in the manual for details.
0559	Error	Setup Error (Illegal preceding or trailing space characters.)	Space character(s) are present at the beginning and/or end of the specified value.	<ul style="list-style-type: none"> - Remove preceding and trailing space character(s) from the specified value. - See parameter description in this manual for details.
0560	Error	Setup Error (Invalid Value)	The specified value is invalid. (E.g. A letter was wrongly	<ul style="list-style-type: none"> - Specify a valid value. - See parameter description

No.	Type	Message	Description	Remedial Measures
			entered for a numeric parameter.)	in this manual for details.
0701	Error	Comm Error	This is a general communication error. The application will automatically retry to communicate with the DTSX200. If the failure persists, adopt the remedial measures.	<ul style="list-style-type: none"> - Try rebooting the PC. - Try rebooting the DTSX200. - Check the transmission path between the PC and DTSX200.
0702	Error	SFTP Connect Error	SFTP connection has failed.	<ul style="list-style-type: none"> - Try rebooting the PC. - Try rebooting the DTSX200. - Check the transmission path between the PC and DTSX200.
0703	Error	SFTP Login Error	SFTP login has failed.	<ul style="list-style-type: none"> - Try rebooting the PC. - Try rebooting the DTSX200. - Check the transmission path between the PC and DTSX200.
0704	Error	SCP Connect Error	SCP connection has failed.	<ul style="list-style-type: none"> - Try rebooting the PC. - Try rebooting the DTSX200. - Check the transmission path between the PC and DTSX200.
0705	Error	SCP Login Error	SCP login has failed.	<ul style="list-style-type: none"> - Try rebooting the PC. - Try rebooting the DTSX200. - Check the transmission path between the PC and DTSX200.
0706	Error	DTS Connect Error (IP Address Error.)	DTSX200 was not found at the specified IP address.	<ul style="list-style-type: none"> - Check the IP address of the DTSX200. - Check that DTSX200 is powered on. - Check the transmission path to the DTSX200. - Try rebooting the PC. - Try rebooting the DTSX200.
0707	Error	SSH Connect Error	SSH connection has failed.	<ul style="list-style-type: none"> - Try rebooting the PC. - Try rebooting the DTSX200. - Check the transmission path between the PC and DTSX200.
0708	Error	SSH Login Error	SSH login has failed.	<ul style="list-style-type: none"> - Check the user ID and password. - Try rebooting the PC. - Try rebooting the DTSX200. - Check the transmission path between the PC and DTSX200.
0709	Error	Measurement Error	An error was detected during measurement preparation or during measurement.	<ul style="list-style-type: none"> - Check that the DTSX200 is not performing self-test. - Try rebooting the PC. - Try rebooting the DTSX200. - Check the transmission path between the PC and DTSX200.
0710	Error	Selftest Error	An error was detected during self-test preparation or during self-test execution.	<ul style="list-style-type: none"> - Check that the DTSX200 is not performing measurement. - Try rebooting the PC. - Try rebooting the DTSX200. - Check the transmission path between the PC and

No.	Type	Message	Description	Remedial Measures
0715	Error	DTS Connect Error (The number of DTS connections exceeded limit or port numbers are different.)	The number of DTSX200 connections exceeded the maximum limit or port numbers are different.	DTSX200. - Check the DTSX200 port number. - Reduce the number of connections to the DTSX200 from this software or from data conversion software. - Check the transmission path to the DTSX200. - Try rebooting the PC. - Try rebooting the DTSX200.
0716	Error	Disk Full.	The free space on the specified storage device is below the stipulated value.	- Change to a storage device with sufficient free space for saving trace files. - Try rebooting the PC.
0718	Error	DTS Status Error	DTSX200 initialization is taking too long.	- Try rebooting the DTSX200. - Check the transmission path between the PC and DTSX200.
0725	Error	DTS Connect Error (The port number is different.)	Connection to DTSX200 has failed because port numbers are different.	- Check the port number of the DTSX200. - Check the transmission path to the DTSX200. - Try rebooting the PC. - Try rebooting the DTSX200.
0726	Error	Connection to this DTS is not allowed.	This application version does not allow connection to the DTSX200.	- Try upgrading this software and the DTSX200 system to the latest version. - Try rebooting the PC. - Try rebooting the DTSX200.
0728	Error	DTS Connect Error (IP Address Error.)	DTSX200 was not found at the specified IP address.	- Check the IP address of the DTSX200 - Check that the DTSX200 is powered on. - Check the transmission path to the DTSX200. - Try rebooting the PC. - Try rebooting the DTSX200.
0730	Error	User ID authority is not RW User. Please re-connect with a different user name.	The login user ID does not have RW authority.	- Check the authority of the login user name. - Try rebooting the DTSX200.
0731	Error	Please perform installation from a disk.	You should re-install the application from the installation disk.	- Reinstall the application.

● **Fatal Error messages**

List of Fatal Error Messages

No.	Type	Message	Description	Remedial Measures
0001	FatalError	Startup Error (Failed to copy folder(s).)	The startup process has failed to copy a work folder.	- Try rebooting the PC. - Try reinstalling the software. - Try replacing the PC.
0002	FatalError	Startup Error (Failed to read a configuration File.)	The startup process has failed to load the default configuration file.	- Try rebooting the PC. - Try reinstalling the software. - Try replacing the PC.
0003	FatalError	Exit Error (Failed to copy or delete folder(s).)	A work folder could not be copied or deleted at software termination.	- Try rebooting the PC. - Try reinstalling the software. - Try replacing the PC.
0004	FatalError	Startup Error (Failed to get an application folder.)	The startup process has failed to get the folder name containing this software.	- Try rebooting the PC. - Try reinstalling the software. - Try replacing the PC.
0005	FatalError	Startup Error (Failed to get an application launch ID.)	The startup process has failed to get an application launch ID.	- Try rebooting the PC. - Try reinstalling the software. - Try replacing the PC.
0006	FatalError	Startup Error (Failed to make folder(s).)	The startup process has failed to create one or more work folders.	- Try rebooting the PC. - Try reinstalling the software. - Try replacing the PC.
0007	FatalError	Startup Error (Failed to get a MyDocuments folder.)	The startup process has failed to get a MyDocuments folder.	- Try rebooting the PC. - Try reinstalling the software. - Try replacing the PC.
0008	FatalError	Startup Error (Failed to get an application work folder.)	The startup process has failed to get an application folder.	- Try rebooting the PC. - Try reinstalling the software. - Try replacing the PC.
0009	FatalError	Startup Error (Failed to start a application. You can use 8 applications at the same time.)	The application could not be started because the limit on the number of DTSX200-related applications (DTAP200, DTAP200D and DTAP200LAS) running concurrently was exceeded.	- Check that no more than 7 instances of the DTSX200-related applications are running concurrently. - Try rebooting the PC.
0010	FatalError	Startup Error (Failed to get a trace folder.)	The specified trace folder or default trace folder was not found.	- Try rebooting the PC. - Try reinstalling the software. - Try replacing the PC.
0101	FatalError	Temperature Calculation Error	Temperature calculation has failed.	- Try rebooting the PC. - Try rebooting the DTSX200.
0591	FatalError	Fatal Error	A non-recoverable software error has been detected.	- Try re-running the software. - Try rebooting the PC. - Try reinstalling the software. - Try replacing the PC.

● **Termination messages**

List of Termination Messages

No.	Type	Message	Description	Remedial Measures
0592	Terminated	Fatal Error (This application will be terminated.)	The software will be aborted because a fatal error has been detected.	- Refer to the remedial measures for the error message displayed before this message.

Appendix B. Version Compatibility

We recommend using the latest version for the DTAP200 software, as well as the firmware on the connected DTSX200, as there may be functional limitations otherwise.

Beware also of possible functional limitations when loading a setting file that is saved using a different software version.

Appendix B.1 Version Compatibility Tables

- **Version compatibility between DTAP200 software and DTSX200 firmware**

The DTAP200 software compares its own version against the version of the firmware installed on a connected DTSX200 and performs version compatibility processing accordingly.

DTAP200 software version	DTSX200 firmware version	Limitations
R1.02.01	R1.02.01	This combination is recommended. (No limitation exists.)
R1.01.01	R1.02.01	Functional limitations exist on the DTAP200 software side.
R1.02.01	R1.01.01	Functional limitations exist on the DTSX200 firmware side. The Calculation Range setting on the Fiber Setting tab of channel settings is not displayed in the DTAP200 software, and measurement result is output using all data.

- **Limitations when loading a setting file saved using a different software version**

Version of DTAP200 used to load settings	Version of DTAP200 used to save settings	Limitations
R1.01.01	R1.02.01	Calculation Range settings newly added in version R1.02.01 are ignored.
R1.02.01	R1.01.01	The Calculation Range setting on the Fiber Setting tab of channel settings defaults to All Data.

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- Registration certificate modified.

- New functions added.

* : Denotes the release number of the software corresponding to the contents of this instruction manual. The revised contents are valid until the next edition is issued.

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