

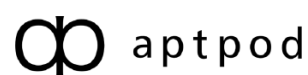


# Visual M2M Data Visualizer Operation Manual

Visual M2M Data Visualizer v3.4.0



2022Q1R1



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## 01 Introduction (Data Visualizer)

**Important:**

- This document is for general informational purposes only. Specifications in this document are subject to change without notice and are not guaranteed.
- Screenshots used in descriptions are examples. Some displays or procedures might differ depending on your environment and application version.

**Note:** Company names, service names, and product names mentioned in this document are generally registered trademarks or trademarks of their respective owners. Trademark symbols "™" and "®" are omitted in the text, figures, and tables.

**Attention:** This document has been translated using machine translation services and may contain inaccuracies and translation errors. Please also refer to the official version in Japanese.

This document describes the basic operations required to display and analyze data by using Visual M2M Data Visualizer (hereinafter called Data Visualizer).



## 02 System requirements for Data Visualizer

A server system must be prepared to use Data Visualizer with each new project. Prepare a client personal computer (PC) with a browser installed. The recommended environment is as follows.

- OS: Windows, macOS
- CPU: Intel 3rd Generation Core i5
- Memory: At least 8 GB
- Network: Internet network environment
- Browser: Google Chrome (Latest version)

## 03 Data Visualizer tutorial videos


Tutorial videos on how to use the Data Visualizer are available.

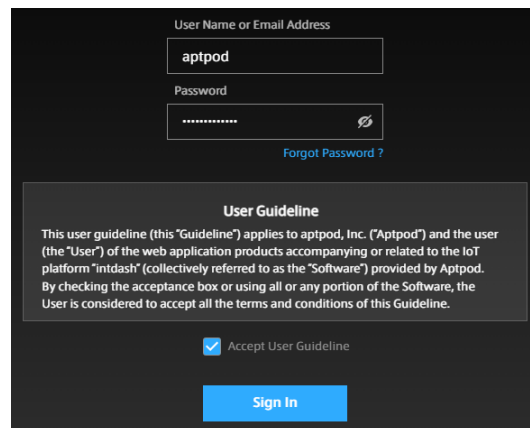
To view the tutorial videos, click on the links listed at the bottom of the following page:

<https://www.aptpod.co.jp/products/data-visualization/> (available in Japanese only)

## 04 Signing in to the Data Visualizer site

Enter the user ID and password in [User Name or Email Address] and [Password] on the sign-in window, agree to the User Guidelines, and then select [Sign In].

Selecting the  button will show or hide text entered in the password field.



The screenshot shows a sign-in form with a dark background. At the top, there are two input fields: 'User Name or Email Address' containing 'aptpod' and 'Password' containing masked characters. To the right of the password field is an eye icon. Below the password field is a link that says 'Forgot Password?'. Underneath these fields is a 'User Guideline' section with a paragraph of text and a checkbox labeled 'Accept User Guideline' which is checked. At the bottom is a blue 'Sign In' button.

Depending on the environment, the [Tenant ID] box may also appear on the sign-in screen. In that case, enter the tenant ID instructed by the administrator. If you leave the [Tenant ID] box blank, you will be signed in to the default tenant.

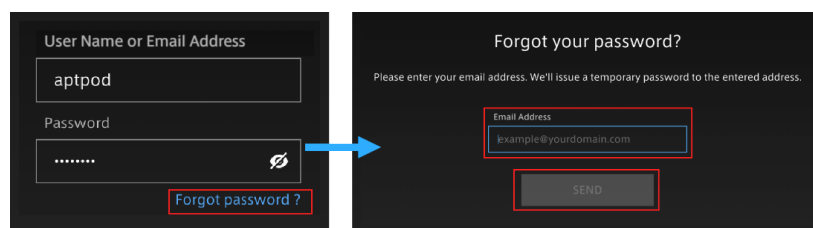
**Note:** When signing in for the first time

If you are signing in with a password issued by the administrator (temporary password), you will need to set a new password yourself. Please follow the on-screen instructions.

**Note:** If you forgot your password

If you forgot your password, reset your password.

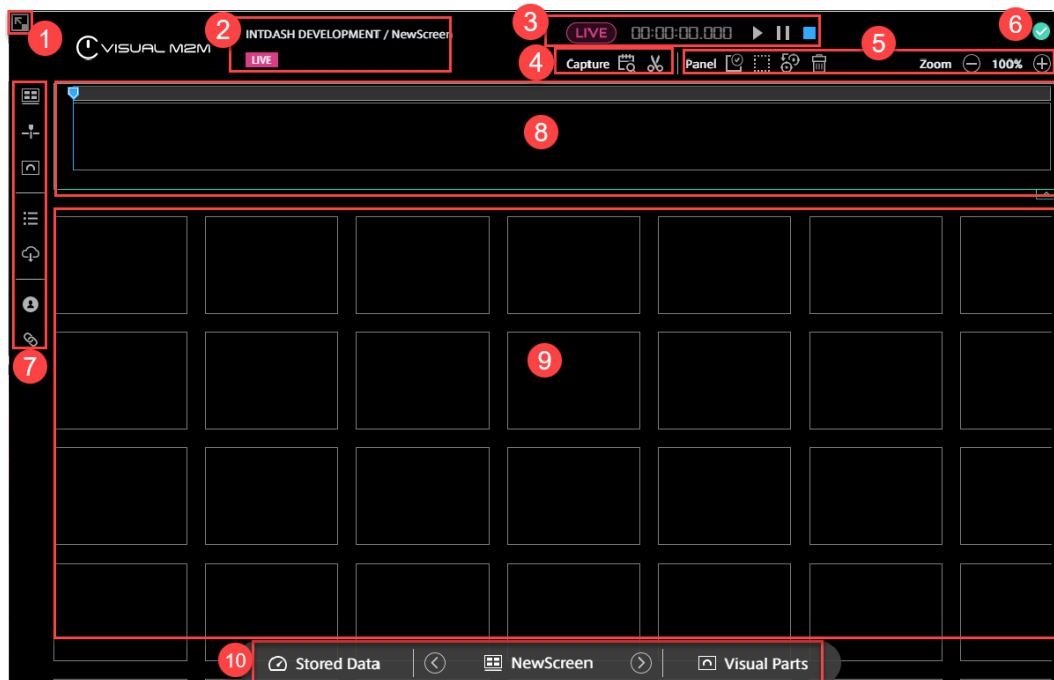
1. Click "Forgot password?".
2. Enter the email address of your account in the [Email Address] field.
3. Click [SEND]. An email will be sent to your email address containing a link you can use to reset your password. You can reset your password from the link.



The diagram illustrates the 'Forgot password' process. On the left, a sign-in form is shown with a red box around the 'Forgot password?' link. A blue arrow points from this link to a 'Forgot your password?' screen on the right. This screen has the text 'Please enter your email address. We'll issue a temporary password to the entered address.' Below this text is an 'Email Address' input field containing 'example@yourdomain.com' and a 'SEND' button, both highlighted with red boxes.

## 05 Structure of the Data Visualizer window

After sign-in, the following window will appear. The parts of the window are as follows.






### 1 Full-screen button

Makes the browser full-screen. Press the [ESC] key to cancel full-screen display.

### 2 Data information

Displays the domain name, name of the screen being displayed, and data loading status. The display is different between live measurement and past data playback.





| Icon                                                                                | Name    | Overview                                     | Used in                 |
|-------------------------------------------------------------------------------------|---------|----------------------------------------------|-------------------------|
|  | LIVE    | Live measurement                             | Only live measurement   |
|  | Reload  | Reloads the past data set in the screen.     | Only past data playback |
|  | Loading | Displays the collection status of past data. | Only past data playback |

### 3 Playback control

The items are different between live measurement and past data playback.



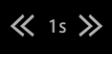

Display of live measurement



| Icon                                                                              | Name      | Overview                                                                     | Used in               |
|-----------------------------------------------------------------------------------|-----------|------------------------------------------------------------------------------|-----------------------|
|  | Live Mode | Live measurement mode. Select this to switch the mode to past data playback. | Only live measurement |
|  | Play      | Starts playback of measurement data.                                         | Common                |
|  | Pause     | Pauses the playback of measurement data.                                     | Common                |
|  | Stop      | Stops the playback of measurement data.                                      | Common                |



#### Display of past data playback



| Icon                                                                                | Name                    | Overview                                                                                                                          |
|-------------------------------------------------------------------------------------|-------------------------|-----------------------------------------------------------------------------------------------------------------------------------|
|  | Live Mode OFF           | Past data playback mode. Select this to switch the mode to live measurement.                                                      |
|  | Repeat                  | Replays measurement data repeatedly.                                                                                              |
|  | Step Backwards/Forwards | Steps backward or forward (step length determined in "Show Forward" ). For details, see <a href="#">Cursor operation</a> (p. 42). |
|  | Speed                   | You can specify the playback speed.                                                                                               |

#### 4 Timeline Control

For details, see [Specifying the playback time range](#) (p. 51).

| Icon                                                                                | Name                | Overview                                                                                  |
|-------------------------------------------------------------------------------------|---------------------|-------------------------------------------------------------------------------------------|
|  | Preview Stored Data | You can specify the playback range of measurement data.                                   |
|  | Create a Capture    | Registers the measurement data within a specified range in [Capture] in the content menu. |

#### 5 Panel operation tools


| Icon | Name             | Overview                                                            |
|------|------------------|---------------------------------------------------------------------|
|      | Select All Panel | Selects all panels.                                                 |
|      | Select OFF Panel | Deselects panels.                                                   |
|      | Replace Edge     | Replaces the edge set in the timeline and panels with another edge. |
|      | Delete Panel     | Deletes the selected panel.                                         |
|      | Zoom in          | Zooms in the screen panel.                                          |
|      | Zoom Reset       | Returns the screen panel to normal magnification.                   |
|      | Zoom Out         | Zooms out the screen panel.                                         |

## 6 Browser performance

| Icon | Status | Description |
|------|--------|-------------|
|      | Good   | Normal      |
|      | Medium | Slight lag  |
|      | Bad    | Lag         |

Click on the browser performance icon to see the details. This information will help you determine the cause of any instability in the Data Visualizer display.

**Browser Performance**

 **Good** Browser performance is stable.

**Rendering Speed of Dashboard**  
57.2FPS

**Memory Usage**  
15 / 4,294.7MB (0.3%)

**Timeline and Panels**  
Timeline **On**  
Number of Panels Used **9**








**Panels with the Highest Load**

1. Open Steet Map **3.7ms** (edge01/Open Steet Map)
2. Line Graph **2.8ms** (edge01/1\_Gen:AccX)
3. Line Graph **1.8ms** (edge01/1\_Gen:AccX)
4. --
5. --

☐ Show Total Time Needed to Render Each Panel (Per Second)

| Item                                                     | Description                                                                                                                                                                                                                                                                                                                              |
|----------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Rendering Speed of Dashboard                             | Displays the number of times per second the entire dashboard is being updated.<br>This value is the maximum rendering speed of the panels. For example, if the rendering speed is set to 60 FPS in the Panel Settings of a panel, but the rendering speed of the entire dashboard is 50 FPS, the panel will only be displayed at 50 FPS. |
| Memory Usage                                             | Displays the "Memory currently in use / Memory available to Data Visualizer".                                                                                                                                                                                                                                                            |
| Timeline and Panels                                      | It shows whether the timeline is displayed or not, and how many panels are displaying visual parts.                                                                                                                                                                                                                                      |
| Panels with the Highest Load                             | Displays a list of five panels (or the timeline) that are placing significant load on the browser.<br>The number (in milliseconds) is the amount of time the panel took up the processing power of the web browser in one second. The higher the number, the greater the load on the web browser.                                        |
| Show Total Time Needed to Render Each Panel (Per Second) | When turned on, the amount of time the panel took up the processing power in one second will be displayed on the timeline and on the panels.                                                                                                                                                                                             |

## 7 Function menu

| Icon                                                                                | Name              | Overview                                                                                    |
|-------------------------------------------------------------------------------------|-------------------|---------------------------------------------------------------------------------------------|
|  | Screen Settings   | Changes the screen settings.                                                                |
|  | Timeline Settings | Changes the timeline settings.                                                              |
|  | Panel Settings    | Changes the panel settings.                                                                 |
|  | Data Settings     | Changes the data settings. For details, see <a href="#">Data settings</a> (p. 20).          |
|  | Data Download     | Downloads measurement data.                                                                 |
|  | User settings     | Use this function to confirm the signed-in user name, and to sign out.                      |
|  | Links             | Displays various links. You can check the version of Data Visualizer <a href="#">here</a> . |





## 8 Timeline

This area shows the main measurement data for analysis and the time axis. For details, see [Timeline](#) (p. 40).

## 9 Screen panels

This area displays measurement data. In this area, the measurement data and edge are bound. For details, see [Data binding](#) (p. 28).

**10** Content menu

| Icon                                                                                                                                                                           | Name         | Overview                                                                                                                             |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|--------------------------------------------------------------------------------------------------------------------------------------|
|  Stored Data                                                                                  | Stored Data  | Displays a list of past measurement data. For details, see <a href="#">Playing back and capturing past measurement data</a> (p. 48). |
|  ScreenName  | Screen       | Displays a list of screens. For details, see <a href="#">Screens</a> (p. 13).                                                        |
|  Visual Parts                                                                                 | Visual Parts | Use this function to select parts to be displayed on the screen panel.                                                               |

**Note:** Screen key shortcuts

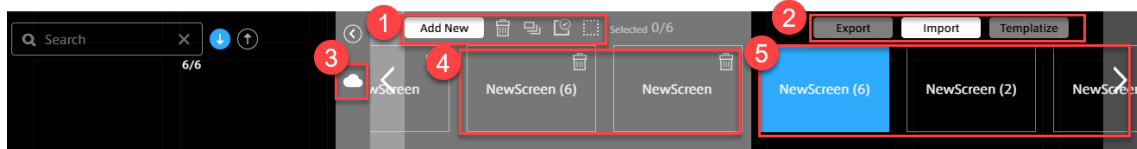
- s: Opening/closing Screen menu
- d: Opening/closing Stored Data menu
- v: Opening/closing Visual Parts menu
- ESC: Unfocusing input, closing a pop-up message, closing a modal window



## 06 Screens

### 6.1 Screens and screen list

A list of screens is displayed. You can create, manage, and switch screens from the list.



#### 1 Operation menu for local screens

##### Add New

Creates a new local screen. For details, see [Creating screens](#) (p. 14).



Deletes the selected local screen. For details, see [Deleting screens](#) (p. 14).



Copies the selected local screen.



Selects all the local screens.



Deselects the local screens.

#### 2 Sharing function menu

[Templateize]: See [Sharing screen: Template](#) (p. 16).

[Export], [Import]: See [Sharing screen: Export, Import](#) (p. 19).

#### 3 Button to show/hide templates

#### 4 Template screens

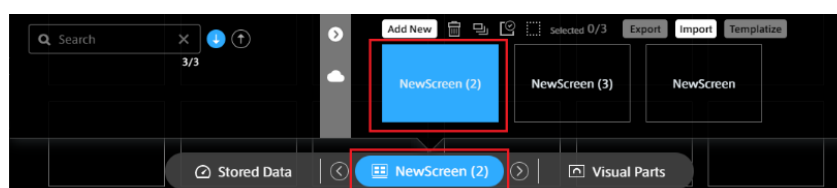
For details, see [Sharing screen: Template](#) (p. 16).

#### 5 Local screens

For details, see [Displaying screens](#) (p. 13) and [Creating screens](#) (p. 14).

### 6.2 Displaying screens

Click the screen selection button in the content menu, and then select one of the screens displayed in the local screen list.



## 6.3 Changing displayed screens

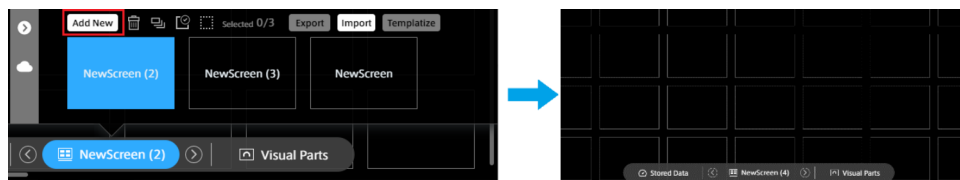
You can directly select a screen to be displayed as described in [Displaying screens](#) (p. 13).

You can also change the displayed screen to the previous or next screen by selecting the [<] and [>] buttons at both ends of the screen selection button.



## 6.4 Creating screens

Selecting the [Add New] button in the screen list will display a blank screen.





Place visual parts and data you want to use on the screen panel (data binding).

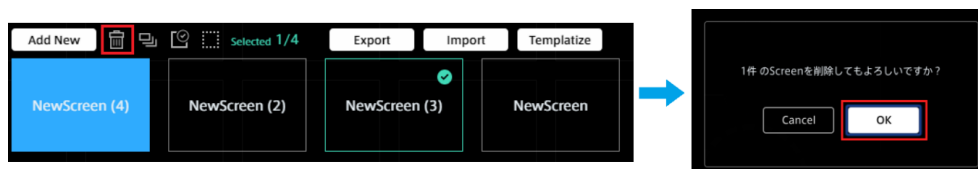
For details about how to bind data to screen panels, see [Data binding](#) (p. 28).

**Note:** Local screens are managed for each client PC. When using another client PC, you need to create screens again. If you want to reuse screens, use [Sharing screen: Template](#) (p. 16) , or [Sharing screen: Export, Import](#) (p. 19).

## 6.5 Deleting screens


Mouse over the screen to be deleted and select the displayed  button.

Select  , and then click the [OK] button in the confirmation dialog box.



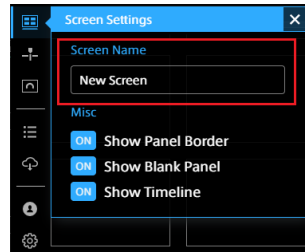
## 6.6 Changing the screen settings

You can change the settings of the displayed screen.

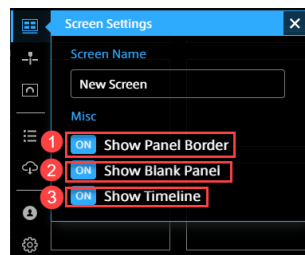
Select  (Screen Settings) from the function menu.

### 6.6.1 Changing the screen name

Enter the desired name in the [Screen Name] text box.

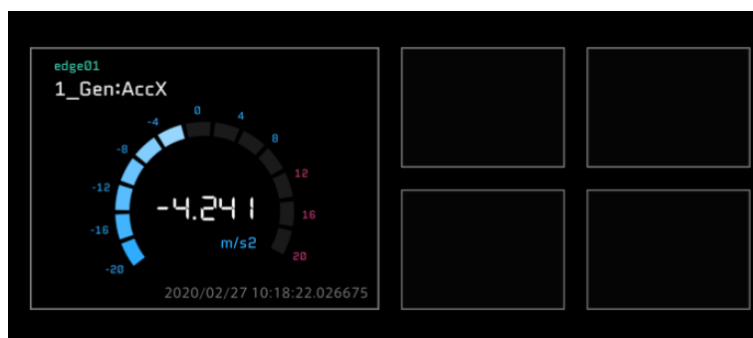


### 6.6.2 Changing the display of the screen panels

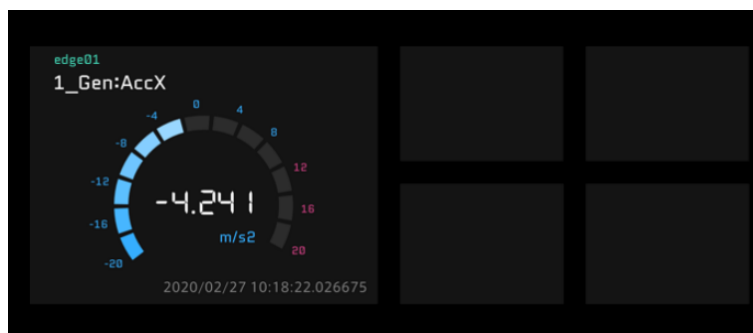


- 1 Show Panel Border**  
Show or hide the panel border.
- 2 Show Blank Panel**  
Show or hide blank panels.

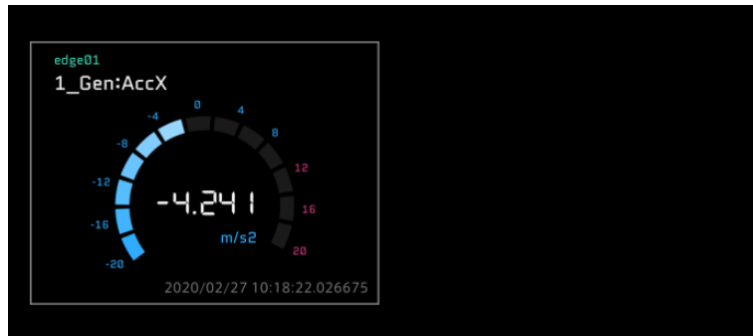
Show Panel Border: ON and Show Blank Panel: ON



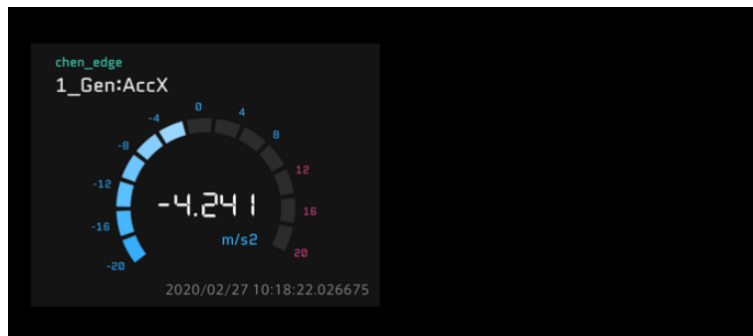
Show Panel Border: OFF and Show Blank Panel: ON



Show Panel Border: ON and Show Blank Panel: OFF

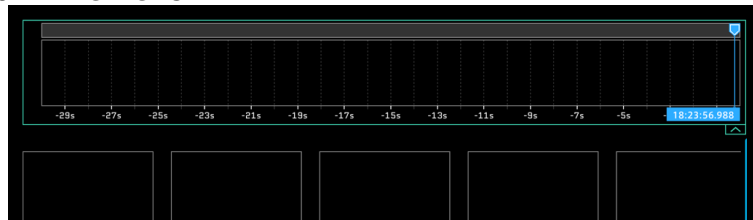


Show Panel Border: OFF and Show Blank Panel: OFF

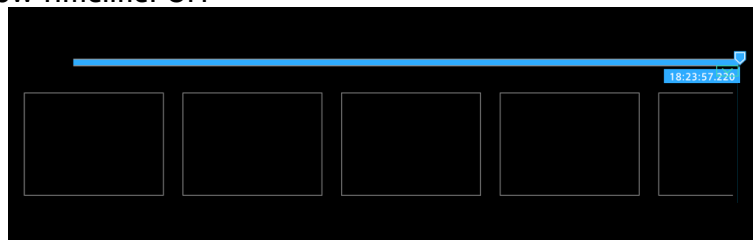


- 3 Show Timeline  
Show or hide the timeline.

Show Timeline: ON



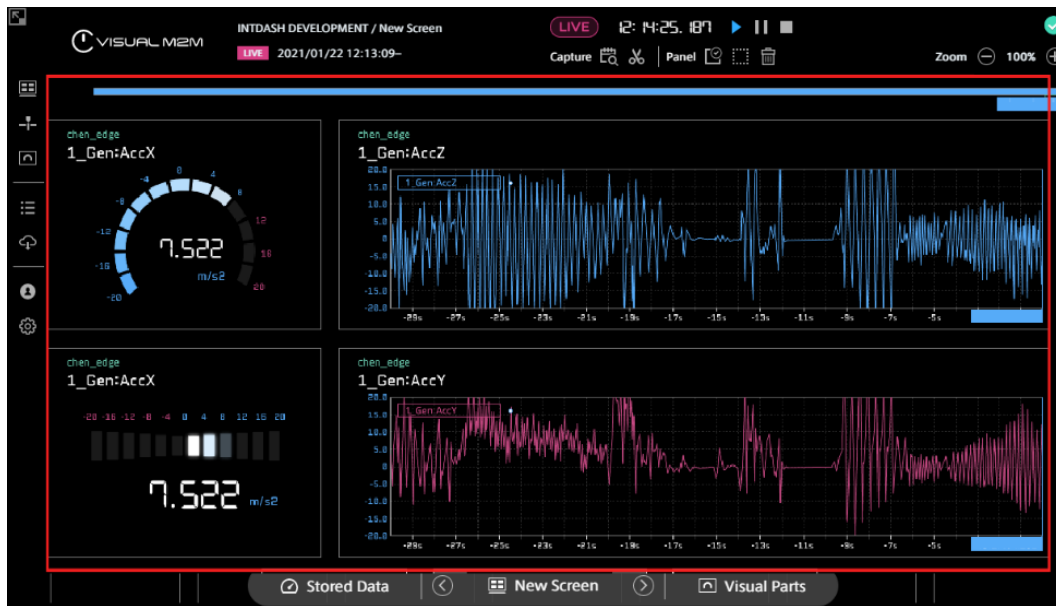
Show Timeline: OFF



## 6.7 Sharing screen: Template


### 6.7.1 Screens

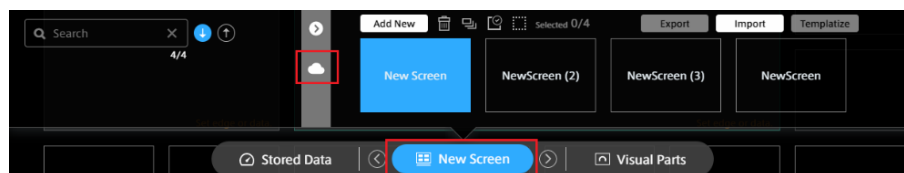
You need to create a screen to display measurement data.  
A screen means a single window that displays all the panels.



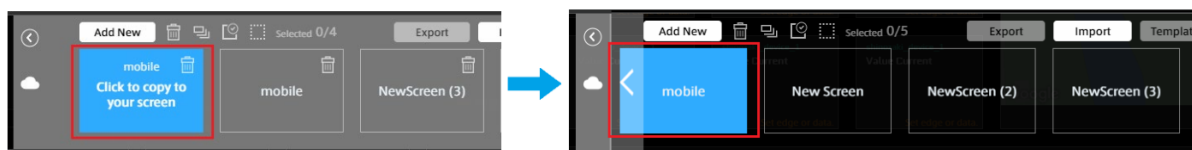
## 6.7.2 Using templates

You can use screen templates managed by the server for each domain.

Click the screen selection button in the content menu and click .




Select a template you want to use. The template will be added to the end of the local screen list.

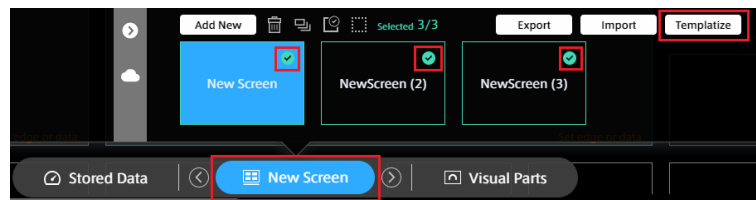



## 6.7.3 Creating and sharing templates

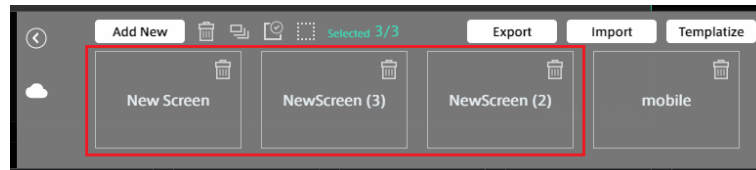
Templates created by users in the same domain can be shared.

Open the screen menu, select the  button of the screen to be shared, and then click the [Templatize] button.

\* Multiple screens can be selected.

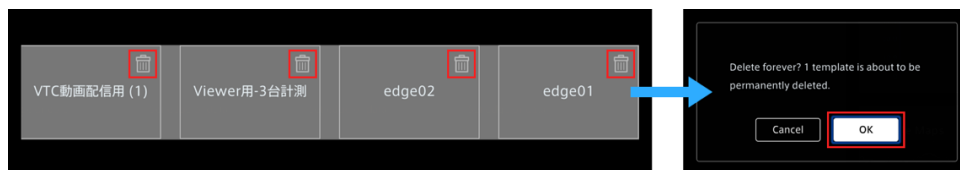


You can check the templates in the template list by selecting the  button.




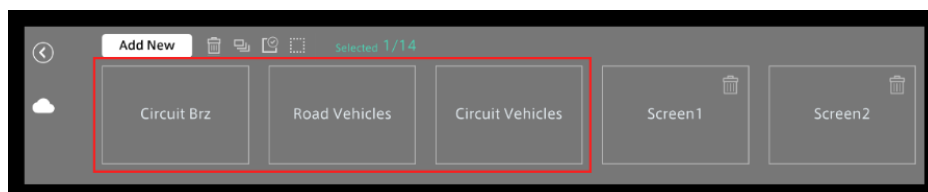
## 6.7.4 Deleting templates

You can delete created templates. Select  in the template, and then click the [OK] button in the confirmation dialog box.



### Note: About template deletion

- You can delete templates created by other accounts in the same domain.
- Templates that have been deleted cannot be restored.
- To use the same template as the deleted one, you need to recreate it.
- The default templates (which have no  icon) cannot be deleted.




## 6.8 Sharing screen: Export, Import

Screens can be shared by local PCs.

Export the screen and save it locally on the PC, and then import the screen to another PC.

### 6.8.1 Export

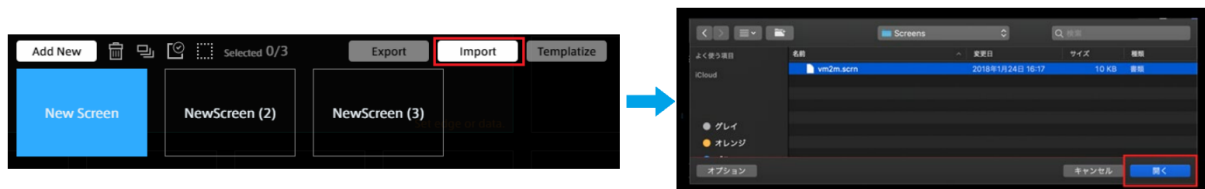
Mouse over the local screen to be shared, select the displayed  button, and then click the [Export] button. Multiple screens can be selected.

The screen definition file (.scrn) is stored in the local PC.



### 6.8.2 Import

1. Click the [Import] button.
2. Select the screen definition file (.scrn) from the file explorer, and then click [Open].



## 07 Data settings

To display measurement data in Data Visualizer, data settings are required.


In intdash, measurement data is handled as binary data. Therefore, binary data must be parsed according to the data type and converted to physical values correctly. The settings for this parsing and conversion are called Data Settings.

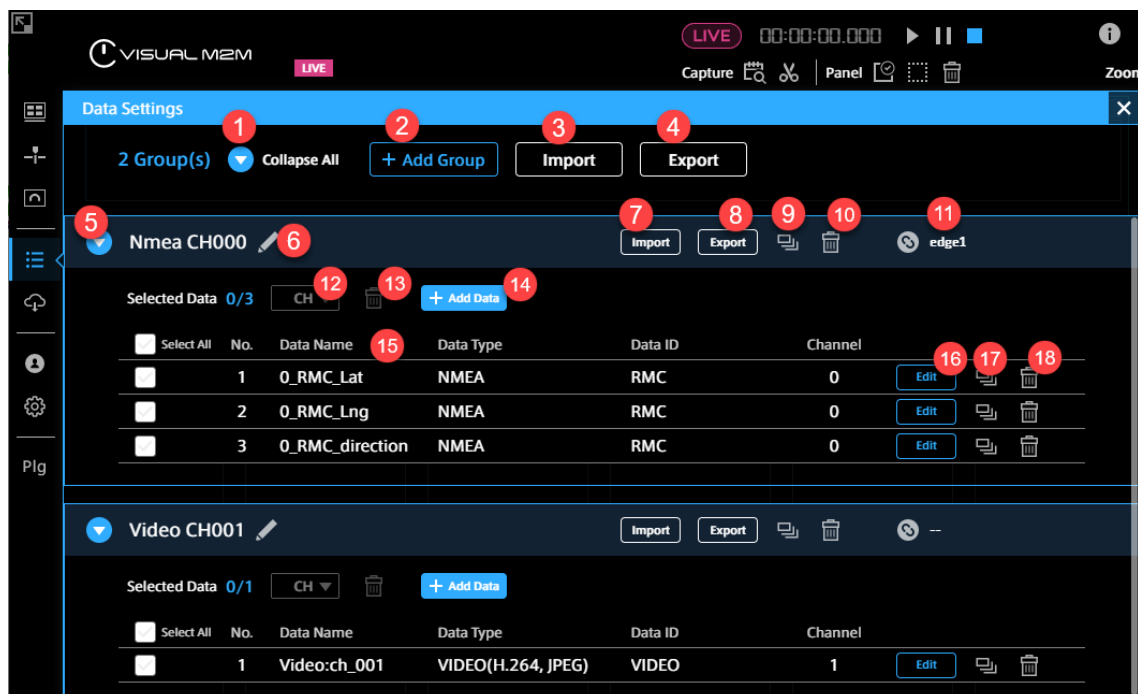
- Settings for CAN data can be created by importing a DBC file.
- Settings for General Sensor, NMEA, Video, Audio, etc. can be downloaded as settings files (DAT files in Data Visualizer's own format) from within the Data Visualizer application. You need to import this DAT file.
- It is also possible to create a new configuration and set the details in a dialog window.

**Note:** Data settings are stored in the web browser, not on the server.

Data Visualizer data settings are saved in the web browser of the PC, not on the server, so data settings created on other PCs will not be displayed. If you want to migrate the data settings to another PC, export the data settings as a DAT file and then import it at the destination.

### 7.1 List of data settings

Click  (Data Settings) to display the list of data settings currently registered in the Data Visualizer.



**1 Expand All/Collapse All**

Expands/collapses all groups.

**2 Add Group**


Adds a group of data settings.

**3 Import (all)**

Imports a DBC file or DAT file to create data settings. See [Create Settings for CAN Data by](#)



[Importing a DBC File](#) (p. 22) and [Importing a DAT file](#) (p. 22).

- 4 Export (all)**  
Exports the settings of all groups as a single DAT file.
- 5 Expand / Collapse**  
Expands or collapses a group.
- 6 Group Name**  
The name of the group. You can edit it by clicking  (Edit).
- 7 Import (Group)**  
Imports a DBC file or DAT file and adds settings to the group, see [Create Settings for CAN Data by Importing a DBC File](#) (p. 22) and [Importing a DAT file](#) (p. 22).
- 8 Export (Group)**  
Exports the settings in a group as a single DAT file.
- 9 Duplicate (Group)**  
Duplicates a group and the data settings within it.
- 10 Delete (Group)**  
Deletes a group and its data settings.
- 11 Associate with Edge**  
Associates this group with a specific edge. The association will allow you to narrow down the data by selecting an edge in the Panel Settings screen.
- 12 CH**  
Changes the channel for the selected data. You can change the channel here at once without opening the edit screen for each data setting.
- 13 Delete (selected item)**  
Deletes the selected data setting.
- 14 Add Data**  
Create a new data setting and add it to this group. For details on the setting method, refer to [Create/edit new data settings](#) (p. 22).
- 15 Data Name, Data Type, Data ID, and Channel**  
Displays some fields in data settings.
- 16 Edit**  
Edit the data setting. For details, refer to [Create/edit new data settings](#) (p. 22).
- 17 Duplicate (1 item)**  
Duplicates a data setting.
- 18 Delete (1 item)**  
Deletes a data setting.

**Note:** DAT files created with Data Visualizer prior to version 3.2  
When importing a DAT file created with Data Visualizer prior to version 3.2, the Data Type field may display a different data type than intended because the data type information is not included in the file. In this case, click [Edit] to change the settings. Even if the Data Type field displays a different data type than intended, it will not affect the data visualization.

## 7.2 Create Settings for CAN Data by Importing a DBC File

You can create data settings by importing a data definition file (DBC file) for CAN data.

Click [Import] at the top of the Data Settings screen and select the DBC file.

**Note:** Text encoding of DBC Files

The DBC file import function supports two types of text encoding, UTF-8 and Shift\_JIS. The encoding is automatically detected. If the imported file contains code points that are not used by Shift\_JIS, it will be imported as UTF-8.

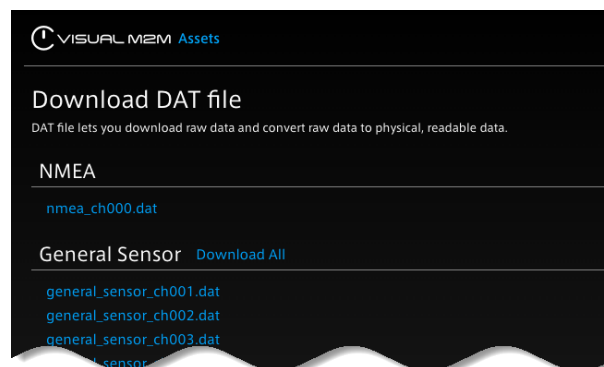
## 7.3 Importing a DAT file

You can import data settings exported from Data Visualizer on another PC, or data settings created in the past.

Click [Import] at the top of the Data Settings screen and select a DAT file.

**Note:** Settings for General Sensor, NMEA, Video, Audio, etc.

Settings for General Sensor, NMEA, Video, Audio and other data can be downloaded from the Data Visualizer application's [Config] > [Download DAT File]. By importing these files, you can easily create settings.



A number such as "ch001" in the DAT file name indicates the channel (ch001 is the settings file for channel 1).

## 7.4 Create/edit new data settings

Click [Add Data] or [Edit] in the Data Settings list. The setting items are as follows.

#### 1 Data Name

The name of the data.

When the Data Type is "CANopen" and the Conversion Type is "As CANopen" , specify the first 4 bytes of the payload of the CAN data to be displayed using 8 uppercase hexadecimal characters (e.g., ABCDEF01). Only the CANopen data whose first 4 bytes of the payload match the specified value will be displayed.

#### 2 Display Name

You can add another name for display. The name you set here will be used as the initial value for the Panel Name.

#### 3 Target Data

Specify the data you want to display by using Data Type, Data ID, and Channel. For details, refer to [Specifying the data to be displayed \(Target Data\)](#) (p. 24).

#### 4 Description

Set an optional description.

#### 5 Conversion Settings

Set the conversion method to physical values, the choices displayed will differ depending on the Data Type of the Target Data. For more information, see [Setting the data conversion method \(Conversion Settings\)](#) (p. 25) .

#### 6 Display Settings

Set how the values will be displayed. Depending on the Conversion Type, different options are displayed. For more information, see [Setting the display format \(Display Settings\)](#) (p. 27).

#### Note: Parsing string data in CSV or JSON format

To parse CSV or JSON data sent to the indash server as a string, select "String" in Data Type, and then select "As CSV" or "As JSON" in Conversion Settings. For more details, refer to [Setting the data conversion method \(Conversion Settings\)](#) (p. 25).

### 7.4.1 Specifying the data to be displayed (Target Data)

Specify the data to be displayed by specifying the Data Type, Data ID, and Channel. Basically, Data Type, Data ID, and Channel should be the same as the settings on the sending edge. However, there are some exceptions. For details, refer to the following.

#### Data Type

Data Type is the data type in iSCP (intdash Stream Control Protocol). Specify the same data type as specified on the sending edge. However, please note that the following cases require a different setting from the iSCP data type.

- In the case of H.264 or JPEG, select VIDEO on Data Visualizer.
- In the case of PCM or AAC, select AUDIO on Data Visualizer.
- When handling CAN data as CANopen, select CANopen in Data Visualizer. If you use "As CANopen" as Conversion Type, specify the first 4 bytes of the payload of the CAN data in Data Name, using 8 uppercase hexadecimal characters (e.g., ABCDEF01).

#### Data ID

Specify the ID set by the sender. For details, follow the table below.

| Data Type           | How to specify the Data ID in Data Visualizer                                                                                    |
|---------------------|----------------------------------------------------------------------------------------------------------------------------------|
| CAN                 | Specify the CAN ID in decimal notation.                                                                                          |
| CANopen             | Specify the CAN ID in decimal notation.                                                                                          |
| NMEA                | Select the message type. Only RMC is supported in the current version.                                                           |
| General Sensor      | Select the type of sensor.                                                                                                       |
| Control Pad         | Specify the value in hexadecimal notation with two uppercase letters. Only 01 is defined in the current version.                 |
| MAVLink1 Packet     | Specify the ID in the format "<System ID (decimal notation)>_<Component ID (decimal notation)>_<Message ID (decimal notation)>". |
| String              | Specify the ID as a string.                                                                                                      |
| Float               | Specify the ID as a string.                                                                                                      |
| Int                 | Specify the ID as a string.                                                                                                      |
| Bytes               | Specify the ID as a string.                                                                                                      |
| Generic             | Specify the ID in hexadecimal notation, uppercase, 8 characters.                                                                 |
| VIDEO (H.264, JPEG) | No need to specify. The data ID is fixed to "VIDEO".                                                                             |
| AUDIO (PCM, AAC)    | No need to specify. The data ID is fixed to "AUDIO".                                                                             |

#### Channel

Channel is a channel in iSCP. Specify the channel set at the sender edge.

## 7.4.2 Setting the data conversion method (Conversion Settings)

In Conversion Type, set how the data should be converted and displayed. The available conversion types vary depending on the Data Type.

### No Conversion (As Binary)

Displays as binary (string in hexadecimal notation) without conversion.

Applicable data types: CAN, CANopen, Control Pad, MAVLink1 Packet, Bytes, Generic

### No Conversion (As Number)

Displays as a number without conversion.

Applicable data types: Float, Int

### No Conversion (As String)

Displays as a string without conversion.

Applicable data types: String

### No Conversion (As NMEA Sentence)

Displays NMEA sentences as strings without conversion.

Example: "\$GPRMC,101020.500,A,3541.2763,N,13943.0267,E,000.0,000.0,010121,,,A\*66"

- Positioning System: When a positioning system is selected, only the data for that positioning system will be displayed. If you select [Auto], all the data will be displayed.

Applicable data types: NMEA

### As NMEA Field

Extracts the value of the specified field.

- Positioning System: When a positioning system is selected, only the data for that positioning system will be displayed. If you select [Auto], all the data will be displayed.
- Field Name: Specify the field for the NMEA data.

Applicable data types: NMEA

### As General Sensor

Extracts the value of the specified field.

- Field Name: Specify a field in General Sensor data. The available fields differ depending on the Data ID.

Applicable data types: General Sensor

### As CSV

Parses string data as CSV (comma separated value) and extracts the value of the specified field.

- Delimiter: Specify the delimiter character for CSV. Example: "," (comma) (up to 999 characters)
- Index: Specify the element number (index is 0-based) of the field to be extracted.
- Value Type: Select whether to treat the extracted value as a string or as a number.
- Offset Factor (only for Number): This value will be added to the value extracted from the CSV. The Offset Factor is applied after the Scale Factor is applied.
- Scale Factor (only for Number) : The value extracted from the CSV will be multiplied by this value.

See also the example below this table for CSV data conversion settings.

Applicable data types: String

### As JSON

Parses string data as JSON and extracts the value of the specified field.

- Field Path: Specify the path of the field to be extracted, using an object key or array index.
- Value Type: Select whether to treat the extracted value as a string or as a number.
- Offset Factor (only for Number): This value will be added to the value extracted from the JSON. The Offset Factor is applied after the Scale Factor is applied.
- Scale Factor (only for Number) : The value extracted from the CSV will be multiplied by this value.

See also the example below this table for JSON data conversion settings.

Applicable data types: String

#### **As Fixed Point Number (CAN Format)**

Extracts a portion of the binary data and treats it as a fixed-point number.

- Start Bit: Specify the start position (bit offset) of the part to be extracted from the binary data (integer value from 0 to 8191). The position will change depending on your choice of endianness.
- Bit Length: Specify the bit length to be extracted from the binary data (integer value from 1 to 8192).
- Offset Factor: This value will be added to the extracted value. The Offset Factor is applied after the Scale Factor is applied.
- Scale Factor: The extracted value will be multiplied by this value.
- Sign: Specify Signed or Unsigned.
- Endian: Specify the endianness (Big Endian/Little Endian).

Applicable data types: CAN, Control Pad, MAVLink1 Packet, Bytes, Generic

#### **As CANopen**

Same as "As Fixed Point Number (CAN Format)" .

Applicable data types: CANopen

#### **As Floating Point Number**

Extracts a portion of binary data and treats it as a floating-point number.

- Start Byte: Specify the start position (byte offset) of the part to be extracted from the binary data (integer value from 0 to 511).
- Precision: Specify the bit length of the floating-point number (32bit/64bit).
- Offset Factor: This value will be added to the extracted value. The Offset Factor is applied after the Scale Factor is applied.
- Scale Factor: The extracted value will be multiplied by this value.
- Endian: Little endian only.

Applicable data types: CAN, Control Pad, MAVLink1 Packet, Bytes, Generic

#### **As String**

Extracts a part of the binary data and treats it as a string.

- Start Byte: Specify the start position (byte offset) of the portion of binary data to be extracted as a character string (integer value from 0 to 511).
- Byte Length: Specify the byte length to be extracted from the binary data (integer value from 1 to 512).

Applicable data types: CAN, Control Pad, MAVLink1 Packet, Bytes, Generic

**Note:** Example of CSV data conversion

As an example, consider the case where string data (Data Type: String) such as "1,2.34,5" is received and parsed as CSV.

Assume that the following data settings have been made:

- Conversion Type: As CSV
- Delimiter: , (comma)
- Index: 1
- Value Type: Number
- Offset Factor: 1
- Scale Factor: 10

In this case, the numeric value 2.34 in the comma-separated column with index 1 will be extracted. That number will be multiplied by Scale Factor 10, and then Offset Factor 1 will be added, resulting in the number 24.4.

**Note:** Example of JSON data conversion

As an example, consider the case where the following string data (Data Type is String) is received and parsed as JSON.

```
{
  "foo": [
    {"bar": 1.23}
  ]
}
```

Assume that the following data settings have been made:

- Conversion Type: As JSON
- Field Path: foo.0.bar
- Value Type: Number
- Offset Factor: 1
- Scale Factor: 10

In this case, the value 1.23 is taken from the path "foo.0.bar". That value will be multiplied by Scale Factor 10, and then Offset Factor 1 will be added, resulting in a value of 13.3.

### 7.4.3 Setting the display format (Display Settings)

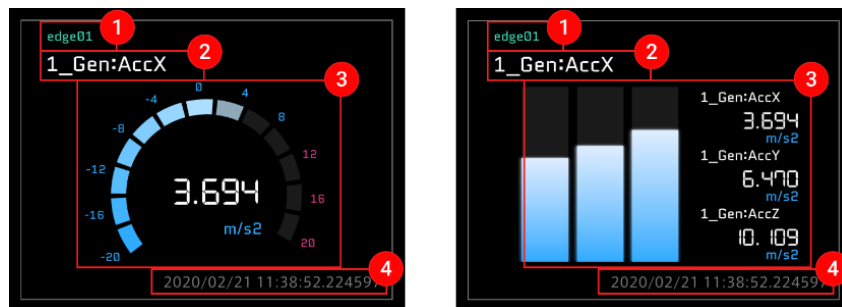
| Item                              | Description                                                                                                                                                                                                                                                                     |
|-----------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Display Type                      | Select whether to display the value as a string or as a number.                                                                                                                                                                                                                 |
| Unit                              | The unit to be displayed with the value.                                                                                                                                                                                                                                        |
| Range                             | (Only when Display Type is set to Number) Specify the range of values to be displayed. This range will be the display range when displaying Meter or Line Graph (This can be changed in each panel).<br>Negative infinity "-Infinity" and infinity "+Infinity" can also be set. |
| No. of Digits after Decimal Point | (Only when Display Type is set to Number) Specify the number of digits to be displayed after the decimal point (integer value from 0 to 9).                                                                                                                                     |
| Threshold (Lower/Upper)           | (Only when Display Type is set to Number) Specify the threshold value. If this threshold value is exceeded, a threshold error is displayed on the panel.                                                                                                                        |

## 08 Data binding

Data binding is the arrangement of data displayed on the panels of a screen.

### 8.1 Panel configuration

A panel is an area where visual parts are displayed. You can set visual parts individually and change their display size.



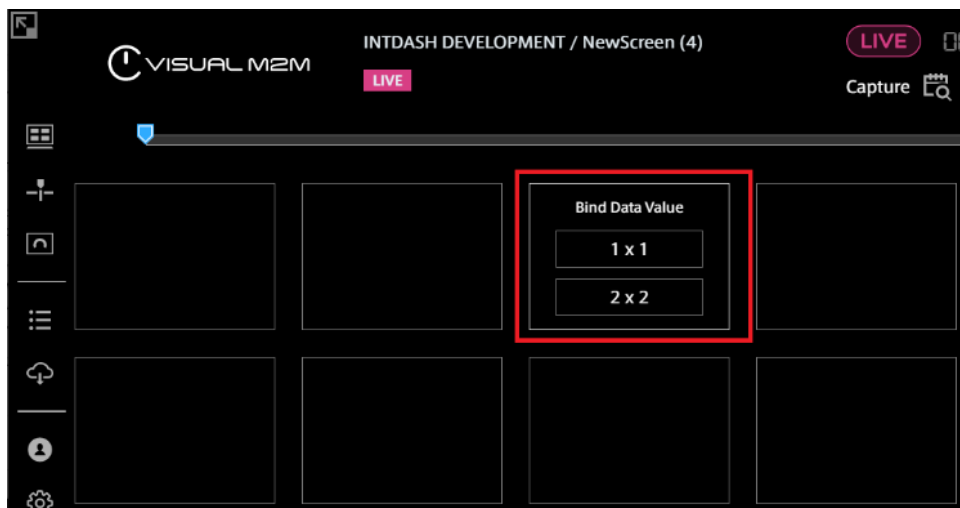
- 1 Edge Name**  
The name of the edge bound to the panel.
- 2 Panel Name**  
The name of the panel. If this is not set, the first bound data name is displayed.
- 3 Display Area**  
An area to display the set visual part and the numerical values of the data. The display format differs depending on the visual part type.
- 4 Timestamp**  
The time of data acquisition is displayed.

### 8.2 Data binding

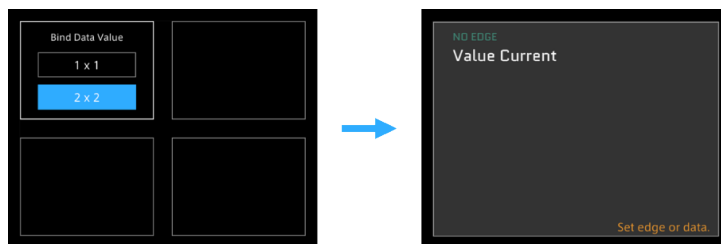
#### 8.2.1 Creating panels

Select the panel you want to create on the screen panel, and then select [1x1] or [2x2].





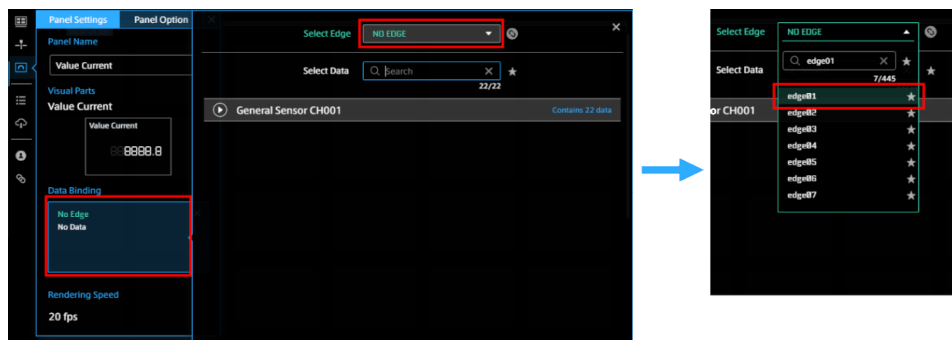
In the following example, [2x2] is selectable.



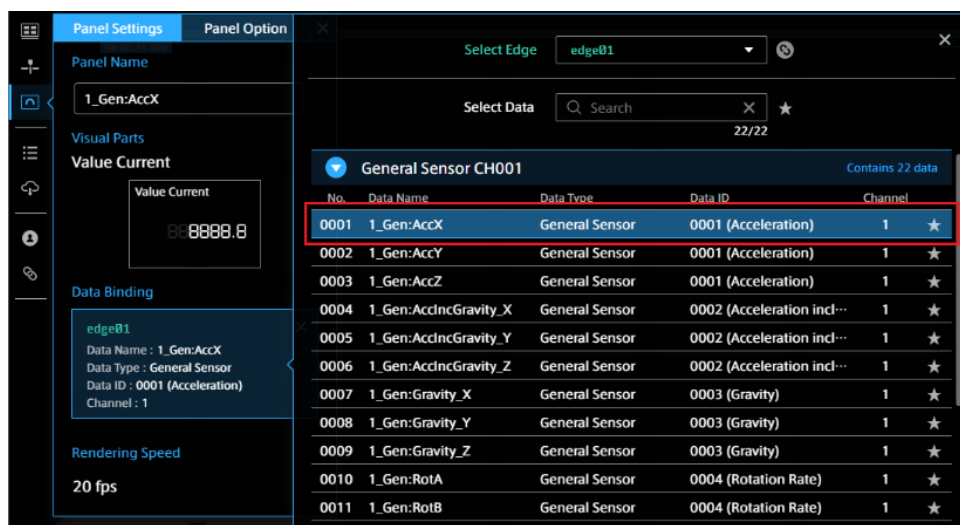
The following two images show two examples in which a "2x2" panel cannot be created.



- ❶ If another panel has been set in the required space
- ❷ If there is no space for the right edge or last line of the window
  1. Click [Bind Data] in Panel Settings.
  2. Click [Select Edge] from the displayed window and select the edge from the list.



3. After the edge is set, select the data from the Select Data list.



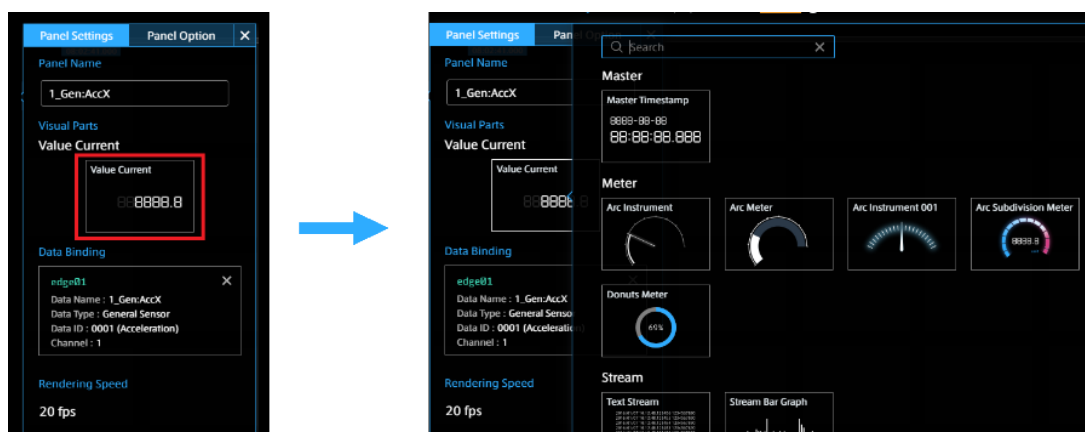
4. Once the edge and the data have been set, click [x] to close the window.

5. Click [x] to close the Panel Settings window.

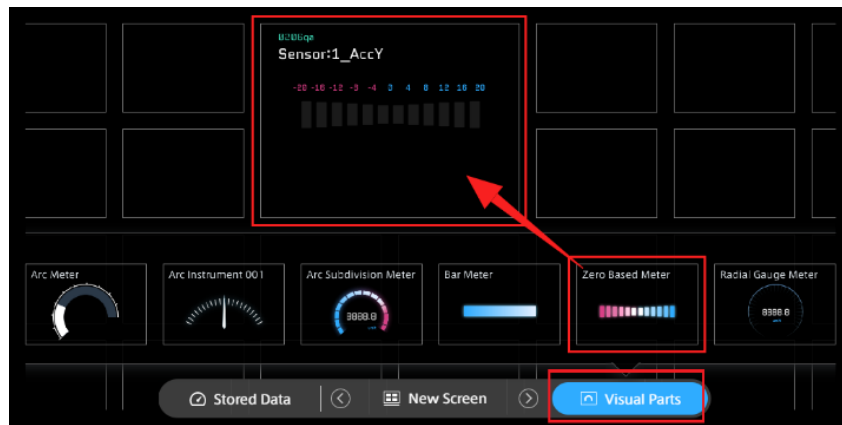
## 8.2.2 Setting visual parts

Next, set visual parts.

**Method 1:** Click the [Visual Parts] button in Panel Settings, and then select one from the Visual Parts list.



**Method 2:** Click [Visual Parts] from the content menu. Select a visual part from the Visual Parts list and drag and drop it on the target panel.



**Note:** Data binding from Visual Parts

You can also bind data directly from Visual Parts to a blank screen panel.

Click [Visual Parts] from the content menu.

Select the visual part you want to set from the list, and then drag and drop it on the screen panel.



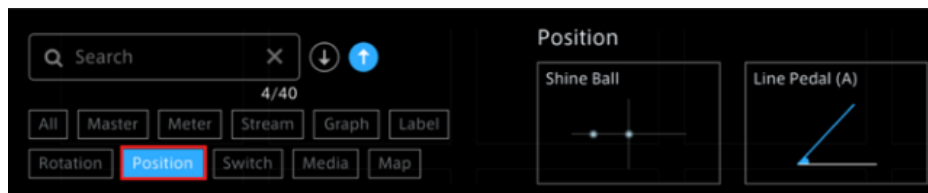
Select Panel Name, set the items displayed on the Panel Settings window, and then set the edge and data.

**Note:** Searching and filtering visual parts


Visual parts can be searched by using the search form or filtering by category.  
Searching by name

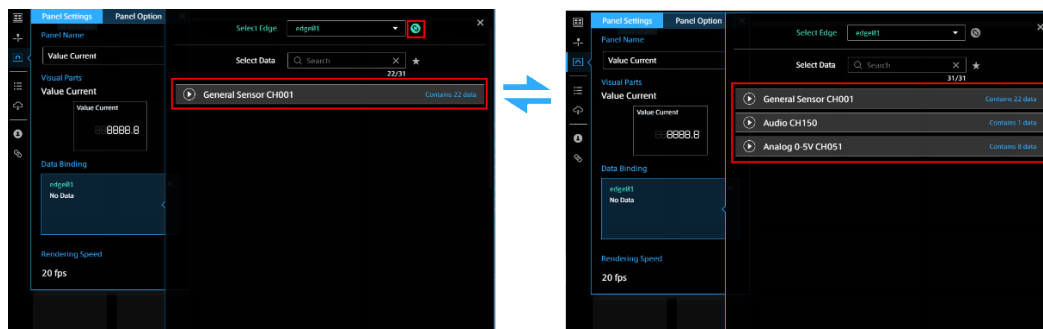



Searching by category



**Note:** Data associated with edges

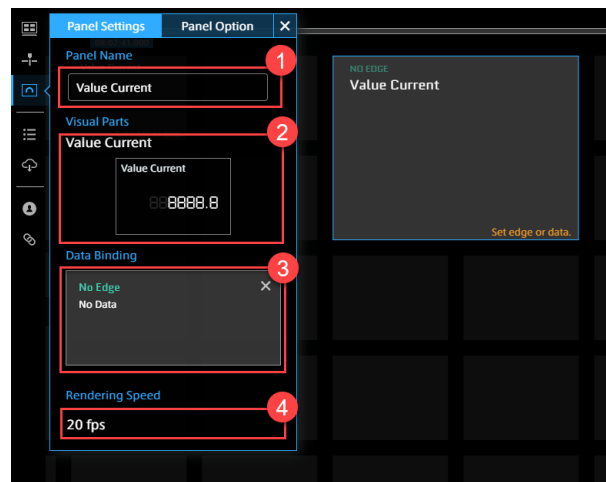
- If data is associated with an edge, only the data associated with the selected edge will be displayed. To display all data, click .



- Click  again to return to the list of associated data only.

### 8.3 Changing the panel settings

Click the upper left area of the panel to set the items on the Panel Settings window.



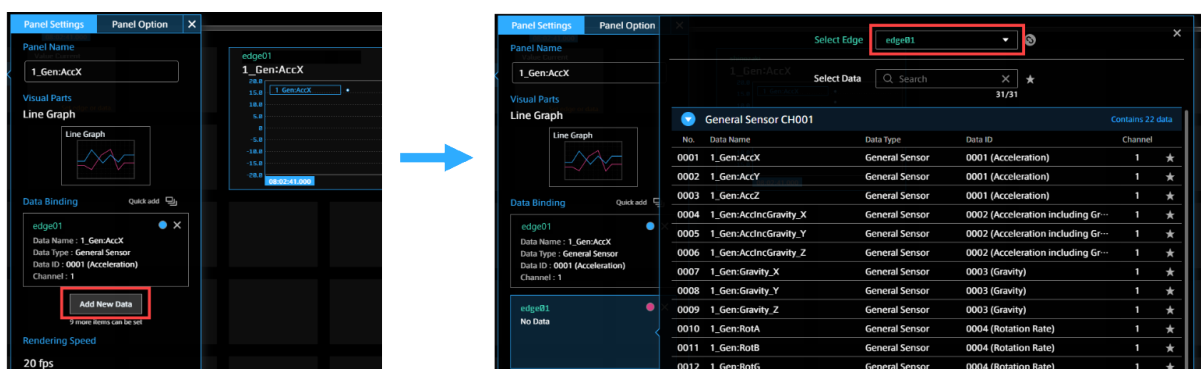
- 1 Panel Name**  
Enter the name to be displayed on the panel. If this is left blank, the data name is displayed.
- 2 Visual Parts**  
Select a visual part.
- 3 Bind Data**  
Select an edge to be used as a data source and select data.
- 4 Rendering Speed**  
You can change the interval at which the parts on each panel are drawn. Reducing rendering speed should reduce the burden on the PC.

## 8.4 Setting multiple pieces of data

Depending on the visual parts, multiple pieces of data can be displayed simultaneously. The maximum number of data pieces that can be bound differs depending on visual parts.

Click Panel Name of the panel for which you want to set multiple pieces of data.

Click the [Add New Data] button from Panel Settings, and then set the measurement data.

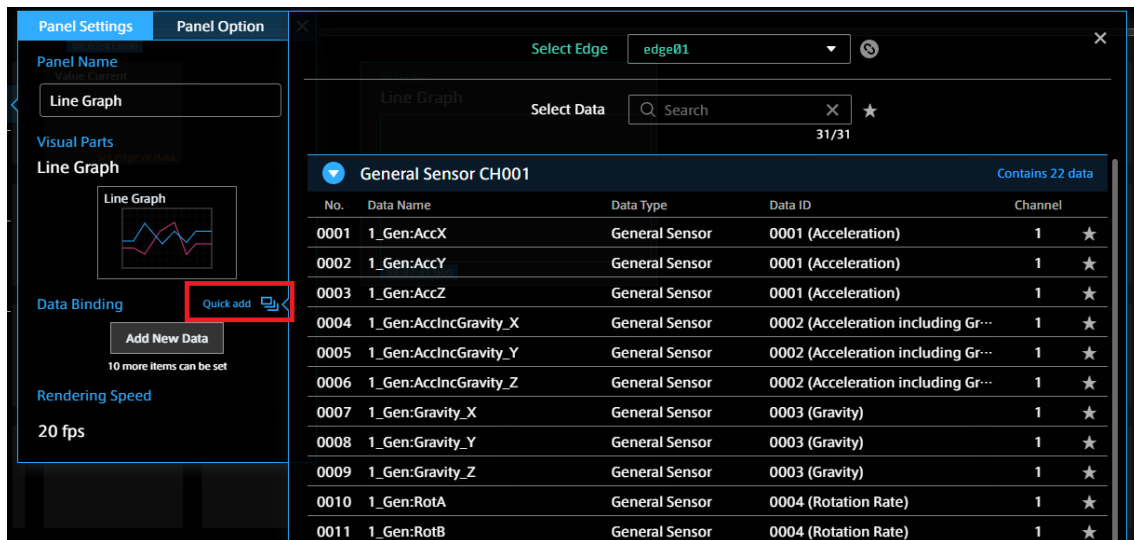


To close the Panel Settings window, select [x] on the Panel Settings window or select anywhere outside the Panel Settings window.

### 8.4.1 Successive setting of Bind Data

Visual parts that can display multiple pieces of measurement data can bind data successively.

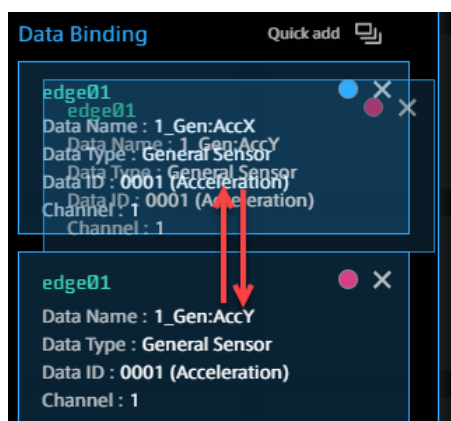
1. Click [Panel Name].
2. You can use [Quick add] to select multiple pieces of data successively with the data and edge selection window opened.



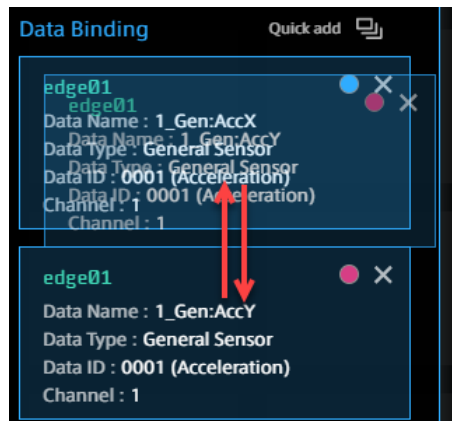
### 8.4.2 About data sorting

You can sort data by a drag-and-drop operation.

Replacement (Drop the target on the card)

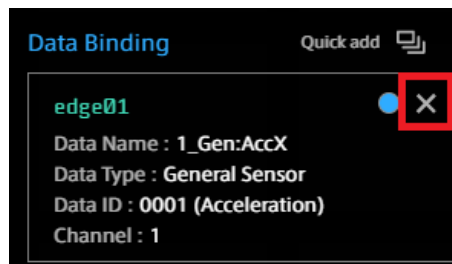


Insertion (Drop the target in the gap between the cards)



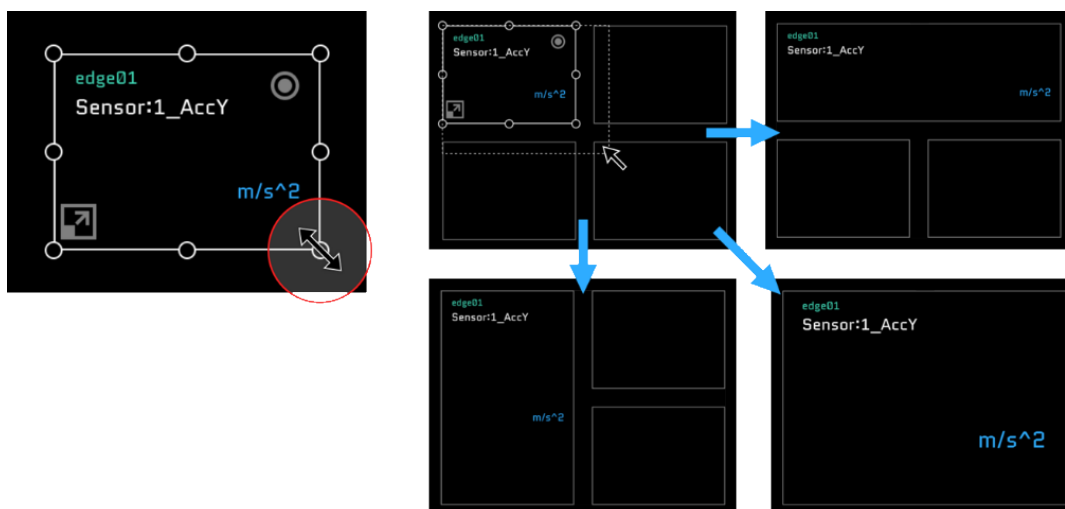
**Note:** To delete the added Bind Data

In the "Bind Data" items of Panel Setting, mouse over the data of the bind data you want to delete, and then select [x].




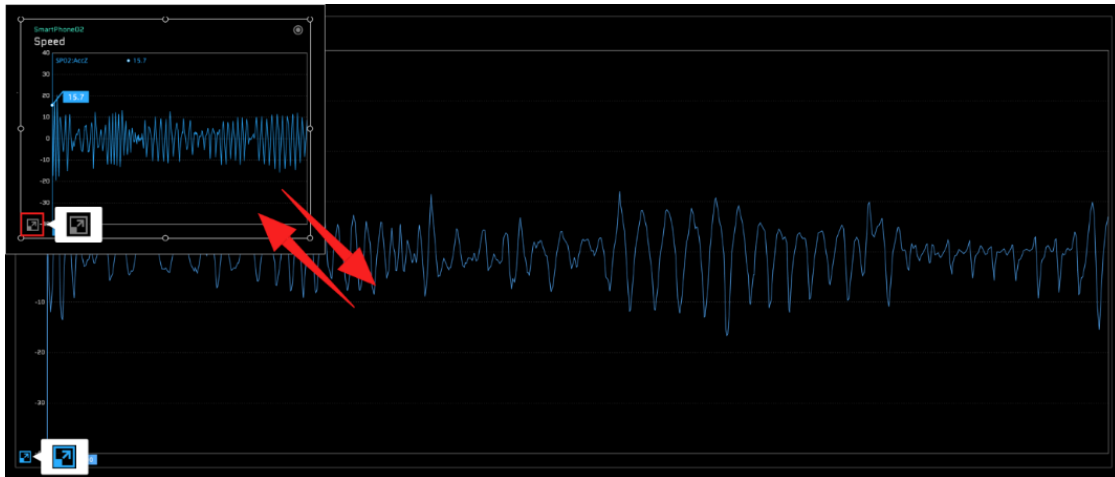
## 8.5 Changing the panel size

You can change the panel size by dragging the guide points on the edges displayed when you mouse over the panel.



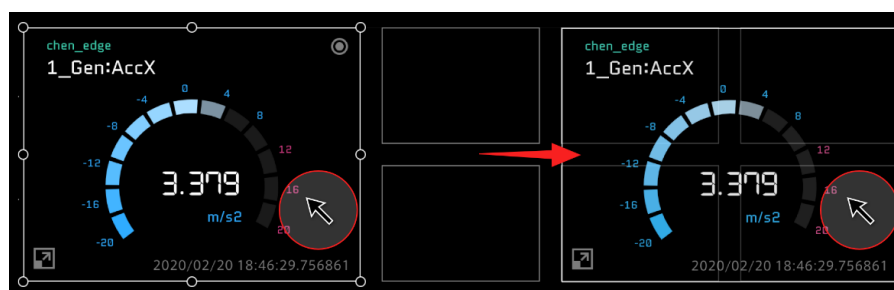
## 8.6 Switching the panel to full-screen display

You can enlarge or reduce the panel by pressing the  button at the bottom left of the panel.



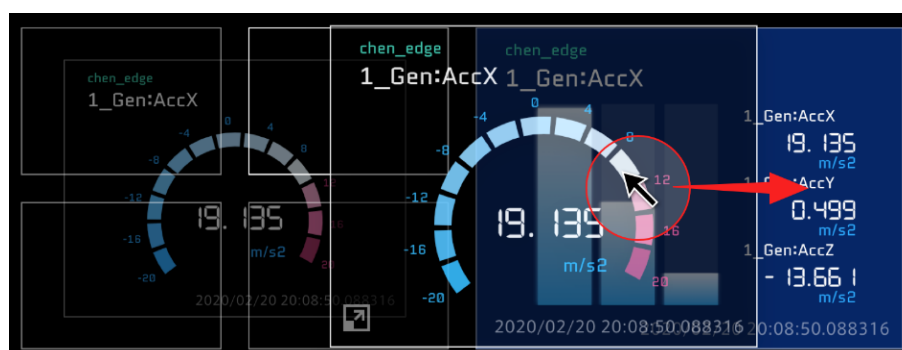
## 8.7 Changing the panel position

You can change the position of the panel by dragging and dropping the panel to a blank panel on the screen.



## 8.8 Replacing panels

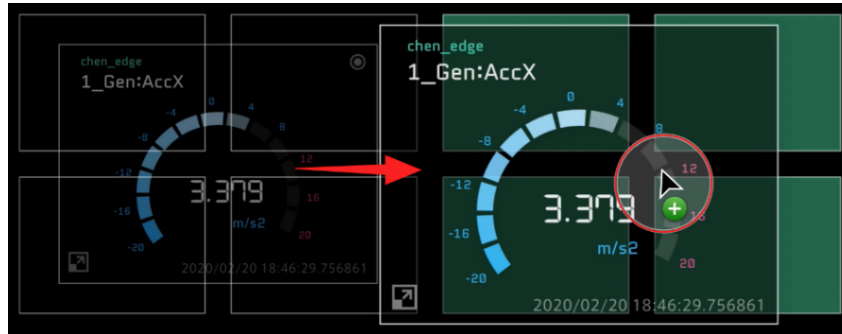
You can replace panels by dragging and dropping a panel to an already set panel.







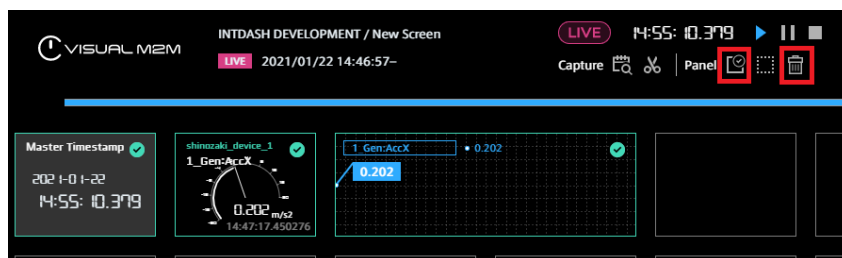
## 8.9 Copying panels

Drag and drop a panel while holding down the Alt key (the option key for Mac). The set data and option settings are all copied.




## 8.10 Deleting panels

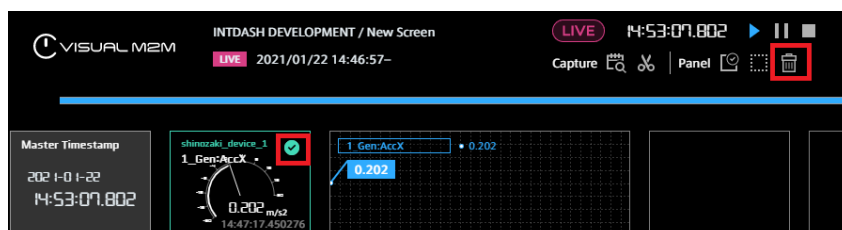
Select  (Select All Panel) in the panel operation tool, and then select  (Delete Panel).



### 8.10.1 Deleting individual data binds

Mouse over the panel you want to delete, and then select the displayed .

Select  (Delete Panel) in the panel operation tool.




#### Note: Selecting panels within a rectangle

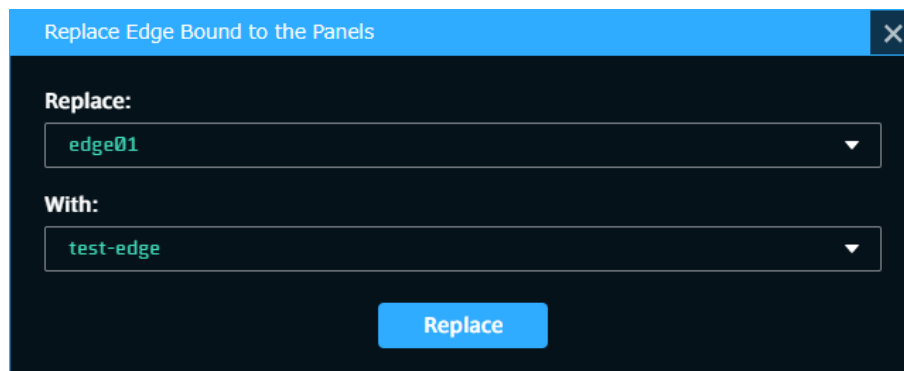
You can select an area of panels by clicking the mouse between panels (or on a blank panel), and then dragging it to create a rectangular selection area. All panels within the rectangle will be selected.

## 8.11 Change edges set in timeline and panels at once

The data source edges set in the timeline and panels can be changed at once.

1. Click  (Replace Edge) in the Panel Operation Tool.
2. Select the edge name to be replaced (Replace:) and the new edge name to be set (With:), and click [Replace].

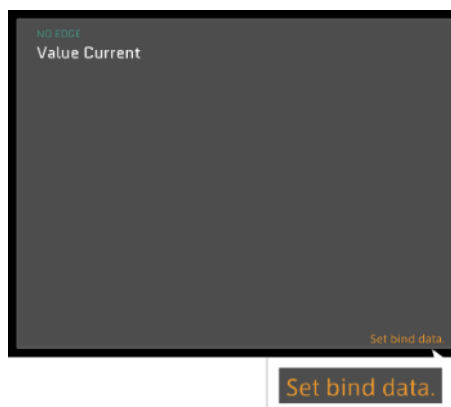
In the following example, the timeline and all panels displaying "edge01" data will be changed to display "test-edge" data.



## 8.12 Error display

### 8.12.1 Errors in panels

When an error occurs at the panel, a message appears on the panel.



#### Set bind data

Data is not bound. Please bind data.

#### Set edge or data

Edge or Data is not set, please set Edge and Data.

#### Data not loaded yet

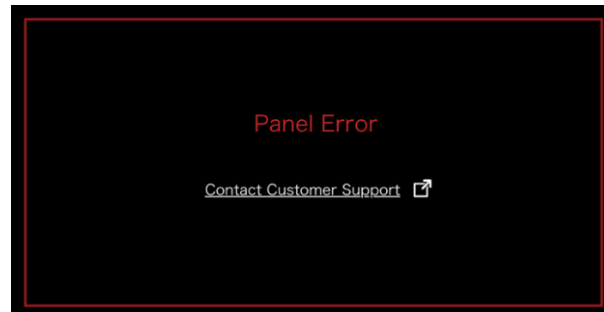
Data not loaded. Please load the data again.

#### Panel Error

Data in an unexpected format has been Bind. Please contact Customer Support.

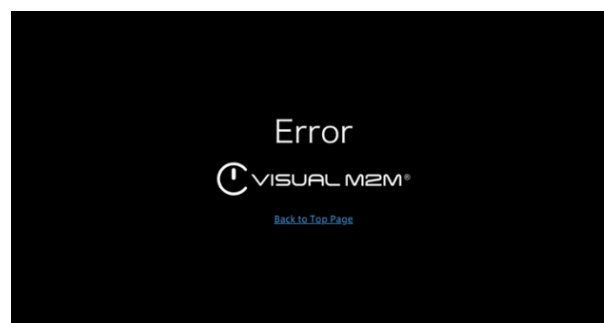
### 8.12.2 Full-screen errors

When an error occurs that cannot be processed by a visual part alone or by certain configurations of visual parts, or if the error affects the screen only, the error will be displayed full-screen.



### 8.12.3 Full-browser error

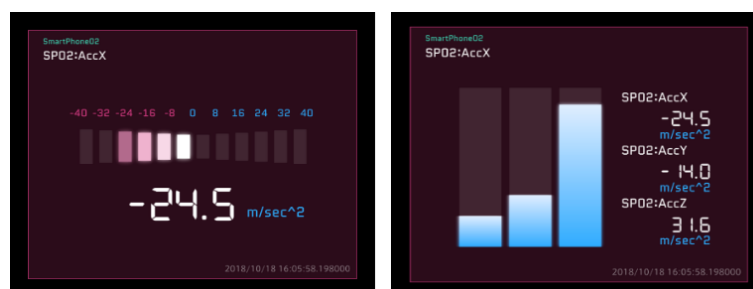
If the error affects the entire program, the entire browser will display an error message.



## 8.13 Display of data exceeding threshold values

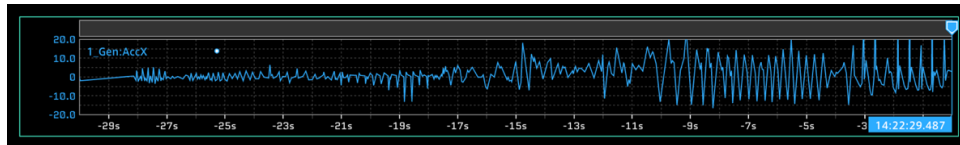
If the data itself exceeds the set thresholds, a threshold error will be displayed on the panel. If multiple data items are being tracked, an error will be displayed even if the threshold for only one of the items has been exceeded.

\* This function does not support line graphs.




## 09 Timeline

You can bind the main measurement data to the timeline. Measurement data is displayed as a line graph.



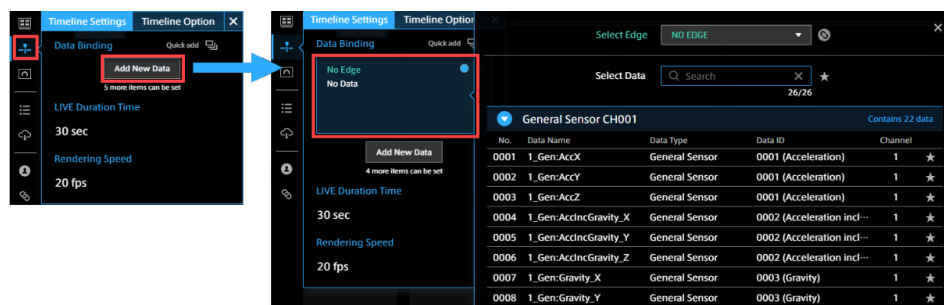
In real time playback, the specified time frame is displayed. In past data display, the entire time frame of the data is displayed.

### 9.1 Binding data to a timeline

1. Select  (Timeline Settings) from the function menu.
2. From the Data Bind item, select [Add New Data], and then set the measurement data to be bound.

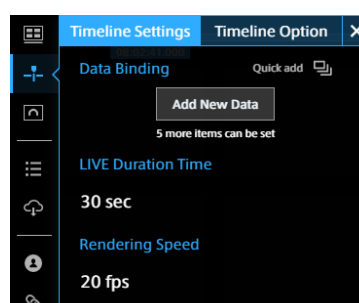
\* It is also possible to bind multiple measurement data items to a timeline (in the same way as Line Graph).

\* The method for binding data is the same as that for a panel. For details, see [Data binding](#) (p. 28).



In [Live Duration Time], specify the range of data to be displayed in real time on the timeline.

#### 9.1.1 Timeline Settings



| Setting item       | Required/Optional | Settings                                                                                                                                                                                                   |
|--------------------|-------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Live Duration Time | Required          | For live measurement, the time range of data to be displayed on the timeline. For example, if "30sec" is set, the data for 30 seconds from the current time is displayed. The default value is 30 seconds. |
| Rendering Speed    | Required          | You can change the rendering interval of the timeline. Reducing the rendering speed can reduce the burden on the PC.                                                                                       |

### 9.1.2 Timeline Option

Timeline Settings | Timeline Option X

Data Range

Min  to   
default: -

Step Forward (Sec)

default: -

Show Compared Position

☐ OFF Show Compared Position

Threshold

☐ OFF Show Threshold Grid

Time (X) Interval (sec)

default: 1

Max Number Of Y Ticks

default: 8

Graph Interpolation

Default

| Setting item           | Required/Optional | Settings                                                                                              |
|------------------------|-------------------|-------------------------------------------------------------------------------------------------------|
| Data Range             | Optional          | Set the maximum and minimum values of the vertical axis. (Up to five sets of values can be set.)      |
| Step Forward (Sec)     | Optional          | You can set the frame advance width for Current Position.                                             |
| Show ComparedPosition  | Optional          | ON: Compared Position (comparison position) is displayed.<br>OFF: Compared Position is not displayed. |
| Threshold              | Optional          | ON: The threshold line set for data is displayed.<br>OFF: The threshold line is not displayed.        |
| Time(X) Interval (sec) | Optional          | Set the interval width for the horizontal axis.                                                       |
| Max Number of Y Ticks  | Optional          | Set the interval width for the vertical axis.                                                         |
| Graph Interpolation    | Optional          | Set the form of a graph.<br>Default: Curved line graph<br>Step: Stepped graph                         |

## 9.2 Cursor operation

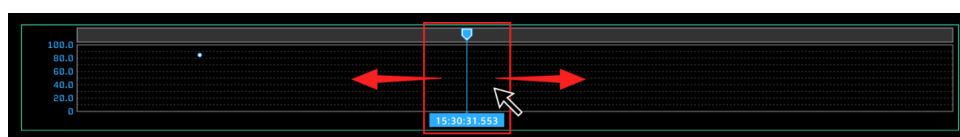
The timeline can display adjustable cursors to indicate two separate points in time: Current Position and Compared Position.

### 9.2.1 Current Position

For real-time display, this will indicate the current point in time. For past data playback, this will indicate the stream replay point.

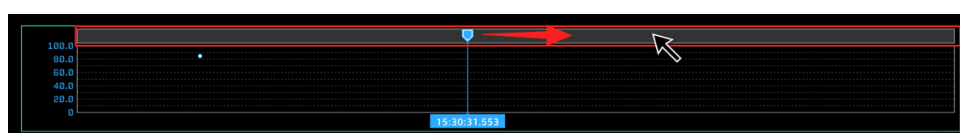


#### Method 1: Dragging Current Position



#### Method 2: Clicking a point on the timeline header

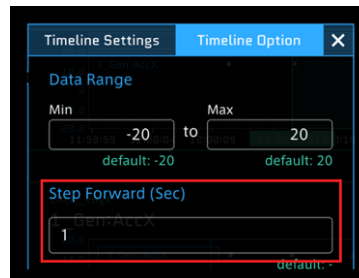
Click a point on the timeline header to move the cursor to that position.



### Method 3: Timeline control

You can step backward or forward by selecting  (Backwards) and  (Forwards) on the timeline control.

The width of cursor movement is determined by the value set in [Timeline Options] > [Step Forward].

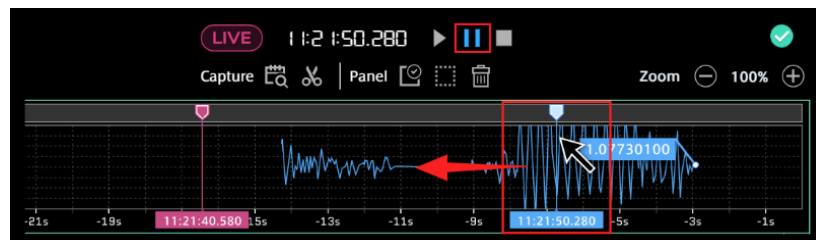


### Method 4: Operation of the ← and → keys on the keyboard

Press the [←] key to rewind, and press the [→] key to advance. The timeline will continue advancing or rewinding as long as the key is held down.

#### Note: Moving Current Position

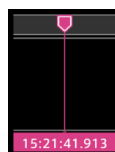
Moving Current Position pauses playback.



After the operation is completed, for past data playback, the state prior to the drag operation (pause state/playback state) is applied. For real-time playback, playback remains paused.

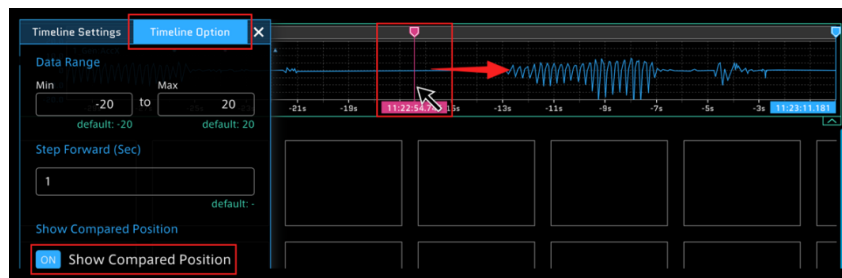
## 9.2.2 Compared Position

Compared Position is used as a position comparative to the Current Position. The differences in values between the Compared and Current Positions can be displayed.



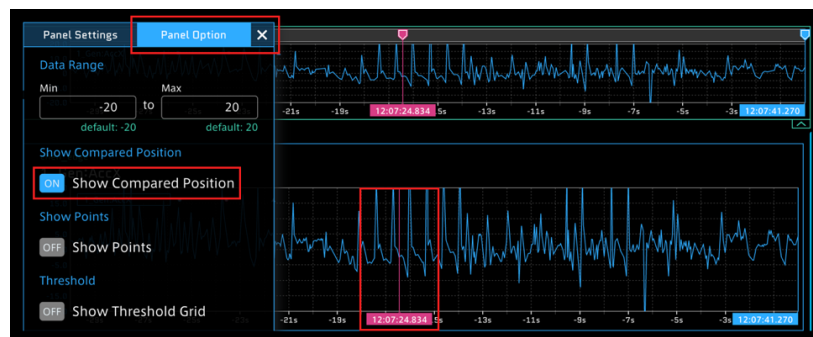
To display Compared Position, select [Timeline Settings] from the function menu. Then, in the [Timeline Option] tab, set [Show Compared Position] to ON.

For both Compared Position and Current Position, the cursor can be moved via drag and drop operation.



**Note:** To display Compared Position on Line Graph

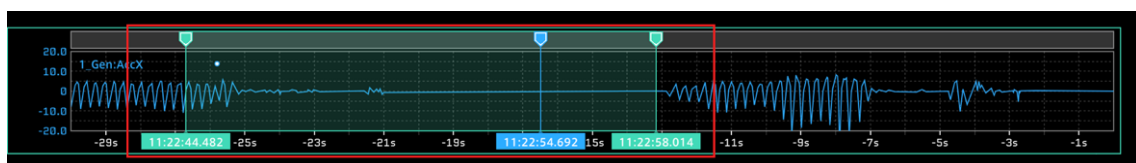
1. Select the Panel Name on Line Graph, and then select [Panel Option].
2. Set [Show Compared Position] to ON.




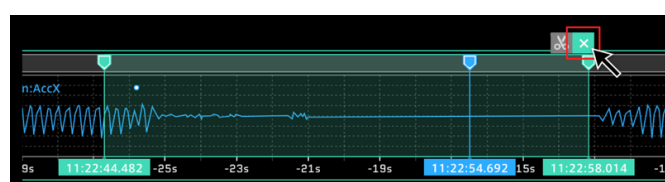
### 9.2.3 Specifying the timeline range

When you drag the mouse to select an arbitrary time range on the timeline, a green cursor is displayed. You can use this green cursor to specify the display time range of the measurement data on the panel. Depending on the visual parts, the measurement data within the specified time range can be displayed.

\* If the time range is not specified, the measurement data is displayed with the entire timeline.



You can cancel the range specification by using the  button in the menu displayed in the upper right when hovering the mouse over the green cursor.

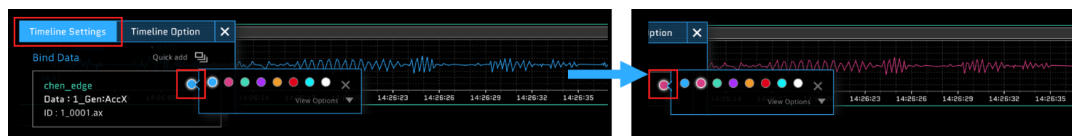




## 9.2.4 Setting timeline details

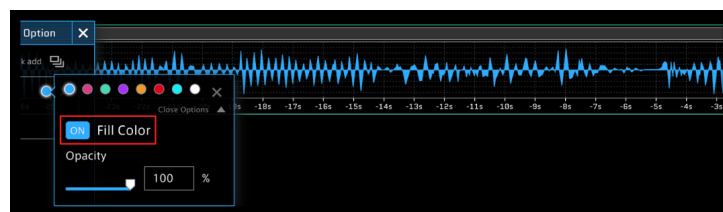
In [Timeline Settings], you can change the color or transparency of the timeline. Select the colored circle in [Bind Data] to open the advanced color settings.

### Changing graph color



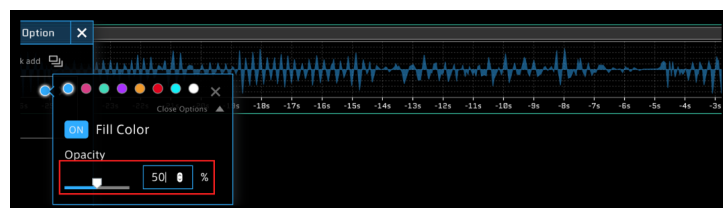
### Filling graph

Click [Fill Color] to set it to [ON] to fill the displayed graph with the color.



### Changing the transparency of the graph

You can change the transparency by dragging the [Opacity] slider or by directly entering a number.

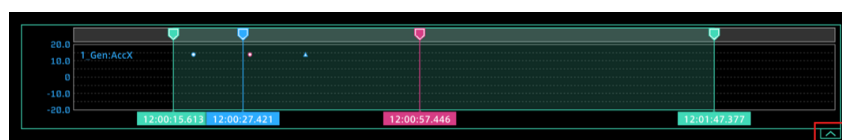


\* The above settings are also available from the Panel Settings window for Line Graph in visual parts.

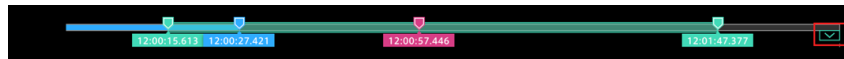
## 9.3 Switching the display size

You can switch the display size between normal display and reduced display by using the button at the bottom right of the timeline.


### Normal display

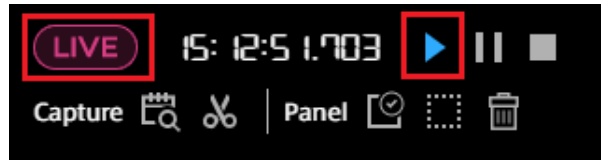


### Reduced display



## 10 Playing measurement data in real time

1. Change to Live Mode in the timeline control.
2. Click  (Play).



When the edge set on the screen is streaming the target data, the data is displayed on the panel on the screen.

**Note:** To display measurement data in real time

The measurement edge and data need to be bound to the screen. For details about how to bind data, see [Data binding](#) (p. 28).

If the measurement data is not displayed, confirm that the edge and data are correctly selected in the data binding to the panel.

# 11 Playing back and capturing past measurement data

## 11.1 Types of past data

There are three types of Stored Data.

### Measurements

Data from the start to end of measurement

### Markers

Markers added to measurements

### Captures

Data cut out from a measurement by specifying a time range as necessary. For details, see [Creating a capture \(record within a specified time frame\)](#) (p. 53).

### 11.1.1 Measurements

| 1          | 2    | 3                   | 4                          | 5       | 6                 | 7     |
|------------|------|---------------------|----------------------------|---------|-------------------|-------|
| 2020/12/02 | LIVE | UUID<br>b6be83b9... | Name<br>Measurement test 1 | 21s     | 22:12:34-22:12:55 | edge1 |
|            | LIVE | UUID<br>e9b59869... | Name<br>Measurement test 2 |         | 10:31:12-         | edge1 |
|            | i    | UUID<br>16284fee... | Name                       | 03m 03s | 18:46:28-18:49:31 | edge1 |
|            | i    | UUID<br>4f805ed9... | Name                       | 05m 05s | 16:36:42-16:41:47 | edge1 |

1 Measurement date

2 Measurement status



Live measurement in progress



Live measurement in progress (with missing data)



Measurement completed



Measurement completed (with missing data)

3 Measurement UUID

4 Measurement name

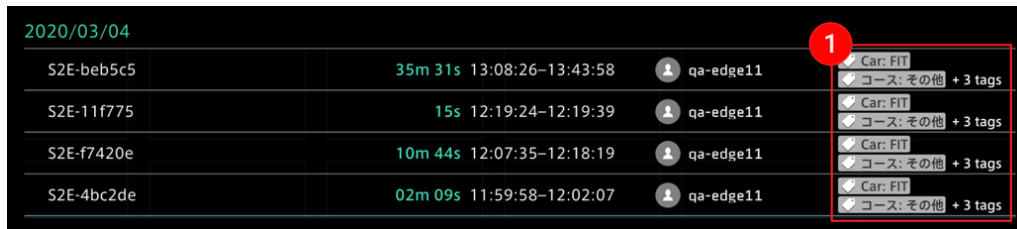
5 Measurement length

6 Start time and end time

7 Name of the edge that created this measurement

### 11.1.2 Markers

Markers that have been given to measurements with other applications are displayed. If there are tags with key-value pairs, they will also be displayed **1**.



| 2020/03/04 |         |                   |           |
|------------|---------|-------------------|-----------|
| S2E-beb5c5 | 35m 31s | 13:08:26-13:43:58 | qa-edge11 |
| S2E-11f775 | 15s     | 12:19:24-12:19:39 | qa-edge11 |
| S2E-f7420e | 10m 44s | 12:07:35-12:18:19 | qa-edge11 |
| S2E-4bc2de | 02m 09s | 11:59:58-12:02:07 | qa-edge11 |

### 11.1.3 Captures

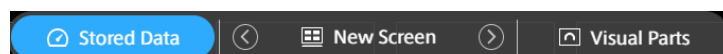
When you mouse over the data item, the **1** [Edit] button and **2** [Delete] button appear. For details about how to create a capture, refer to [Creating a capture \(record within a specified time frame\)](#) (p. 53).



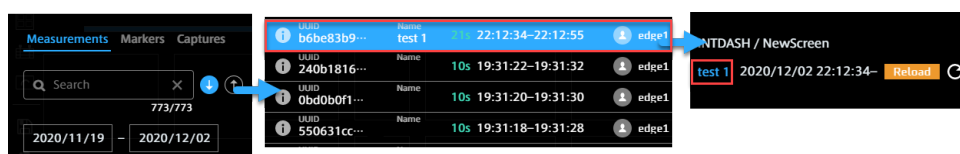
| 2020/03/06 |         |                   |  | CLOSE |
|------------|---------|-------------------|--|-------|
| test2      | 25s     | 18:50:57-18:51:22 |  |       |
| test1      | 32s     | 18:50:51-18:51:23 |  |       |
| test       | 01m 10s | 18:44:30-18:45:40 |  |       |

## 11.2 Replaying past data

1. Select [Stored Data] from the content menu.



2. Select Measurements, Markers, or Captures. Past measurements are displayed in chronological order.
3. Select the measurement you want to display.



#### Note: Captures list

The Captures list shows the captures you (your user account) have created, and all captures created by edge accounts. Captures created by other user accounts are not displayed.

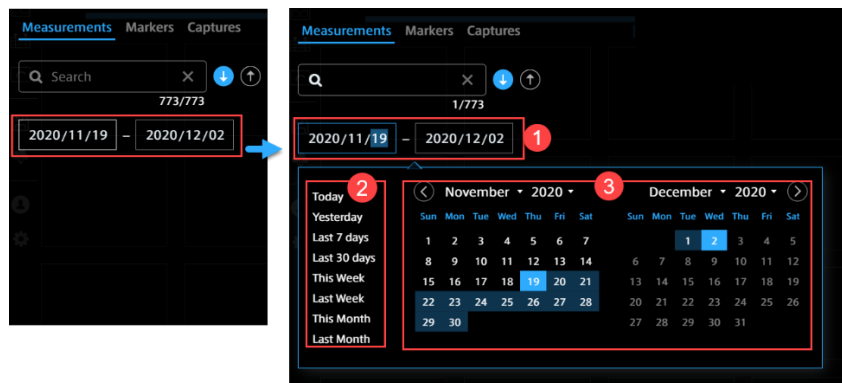
**Note:** Measurement that exceeds the display limit

If you specify a measurement that exceeds the displayable time, the [Preview Stored Data] window appears. Specify a time range in the [Preview Stored Data] window.

## 11.3 Searching for past data

### 11.3.1 Searching by period

Click the date area to set the period. There are three ways to set the period, as follows.



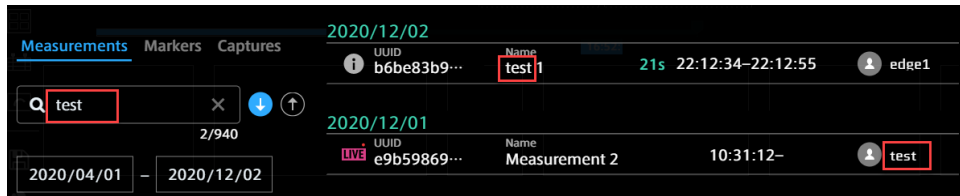
- 1 Enter the dates with keyboard.
- 2 Select a preset period. You can select a value such as "Today", "Yesterday", "Last 7 days", and "Last week", from the menu on the left.
- 3 Select the dates on the calendar.

### 11.3.2 Searching in the list


In the Measurements list, you can search by measurement UUID, measurement name or edge name.

In the Markers list, you can search by marker name, edge name, or tag value.

In the Captures list, you can search by the name of a capture.



## 11.4 Specifying the playback time range

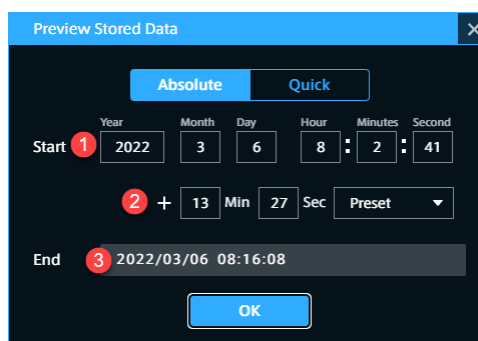
You can replay the measurement data by specifying an arbitrary time range. Click  (Preview Stored Data) on the timeline control.

Absolute mode and Quick mode are provided to specify a period of past data.

### 11.4.1 Absolute mode

This mode is based on the start time.

1. In the [Preview Stored Data] window, enter the start date and time and the playback period you want to display.
2. Click [OK]. After the data is loaded, the data is played from the specified start time



- 1 [Start] Enter a specific start time (seconds can also be set)
- 2 [+Min, Sec] Enter the length of the playback time of the data. (For details, see Point below.)
- 3 [End] End time of the data playback (optional). The calculation result from 1 and 2 is displayed.

**Note:** How to enter the playback period

There are three ways to enter the playback period.

- Method 1: Directly enter numbers in the [Min] and [Sec] boxes.
- Method 2: Mouse over the [Min] or [Sec] box, and then click the displayed arrows. The time can be set in minutes/seconds.

- Method 3: Click [Preset], and then select a preset from the base time provided by the system.

## 11.4.2 Quick mode

This specification method is based on the current time. You can set the period from 1 minute to 1 hour before the current time.

Select [Last XX], and then click the [OK] button.



## 11.5 Creating a capture (record within a specified time frame)

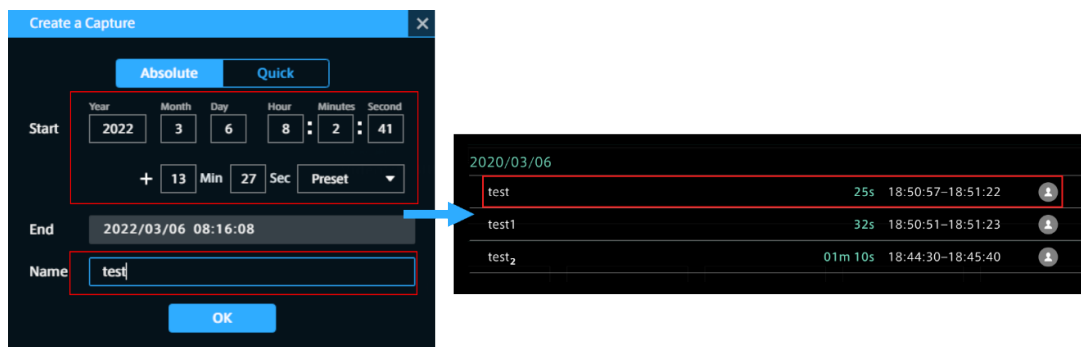
You can specify the data start time and end time, and then register them as a capture in Stored Data. There are two ways to specify the time.

### 11.5.1 Method 1: Directly entering the time

1. Click  (Create a Capture) on the timeline control.




2. Enter the start/end date and time of the data you want to register as a capture and the capture name, and then click [OK].

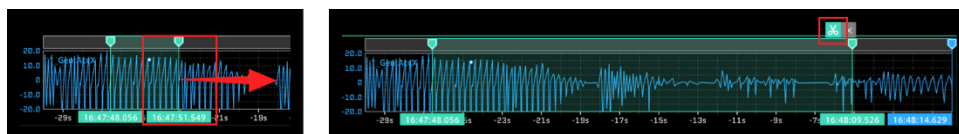


When you select the registered capture, data playback is started.

### 11.5.2 Method 2: Specifying the time on the timeline

You can specify an arbitrary period within the measurement on the timeline.

1. Click the start time and drag it to the end time. The area in light green means the specified period.
2. Adjust the specified period and click .



3. Enter the capture name in the displayed [Create a Capture] window and click [OK].

**Note:** Adjusting the specified period on the timeline

**Adjustment of the start time and end time**

Fine-tune the time frame by dragging the green cursor and click the [Create a Capture] button.



**Adjustment without changing the length of the specified period**

Drag the light green area between the cursors to move it to the left or right. You can adjust the start time and end time while keeping the length of the specified period.



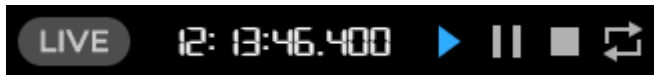
**Note: Captures list**

The Captures list shows the captures you (your user account) have created, and all captures created by edge accounts. Captures created by other user accounts are not displayed.

## 12 Timeline control operation

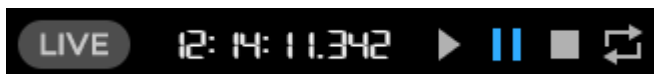
You can control real-time display and past data display by using the timeline control.

**Play** Starts playing of real-time or past data.



**Pause**

Pauses playback and provides analysis of the data at the point paused.



**Stop**

Stops playback and clears the panel data. The data of the panel is cleared.



**Repeat**

Repeats playback when playing back past data.



**Note:** Displaying data at a particular timestamp in the past data playback  
Double-click the Master Timestamp on the timeline control.



Input a timestamp to go to that time point instantly. This allows you to snap to precise points in time, which is more difficult to do from the seek bar.  
For details about how to operate the cursor, see [Cursor operation](#) (p. 42).

## 13 Downloading measurement data in CSV format


Measurement data can be exported to a local PC as CSV.

**Note:** Large measurement data may not be exported

This function exports measurement data loaded into the web browser as CSV. Therefore, measurement data that is too large to be loaded cannot be exported.

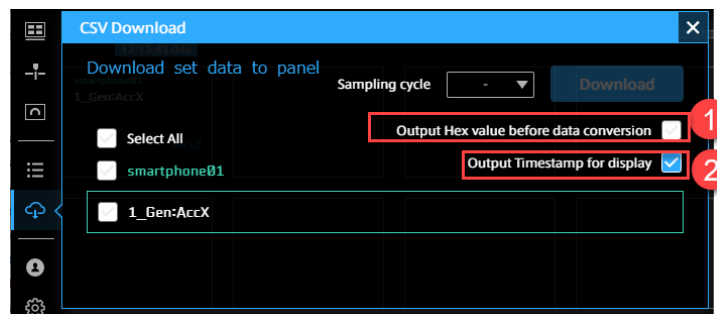
If the measurement data is too large, the message "Download stopped because the data is too large to be loaded to the browser." will be displayed and loading will stop.

In this case, do one of the following to reduce the data to be loaded.

- Use  (Preview Stored Data) to shorten the time range to be loaded.
- Reduce the number of data bound to the screen; Data Visualizer will attempt to load all data bound to the screens (data with specified edge, data type, data ID, and channel). Check for all loaded screens, not just the current screen.

### 13.1 Types of CSV downloading

There are the following two types of optional settings for CSV downloading.



#### 1 Output Hex value before data conversion

If checked, pre-conversion binary data (CAN data from vehicle measurements for example) is downloaded as hex values.

Example of output when OFF (physical value):

```
"#timestamp", "51_Analog_p5V:ch0051_apt_an[edge1]"
"1649397290.214403", 1.0090028229190506
"1649397290.220803", 1.0090791180285341
"1649397290.227203", 1.0090791180285341
"1649397290.233603", 1.0090791180285341
"1649397290.240003", 1.0090028229190506
```

Example of output when ON (hex value):

```
"#timestamp", "51_Analog_p5V:ch0051_apt_an[edge1]"
"1649397290.214403", "0xA93361515B5342650000000000000000"
"1649397290.220803", "0xAA335151385350650000000000000000"
"1649397290.227203", "0xAA335451155322650000000000000000"
"1649397290.233603", "0xAA334A511E533A650000000000000000"
"1649397290.240003", "0xA93367514C5331650000000000000000"
```

## 2 Output Timestamp for display

If checked, timestamps are added to the first row for date-time display. Example of output:

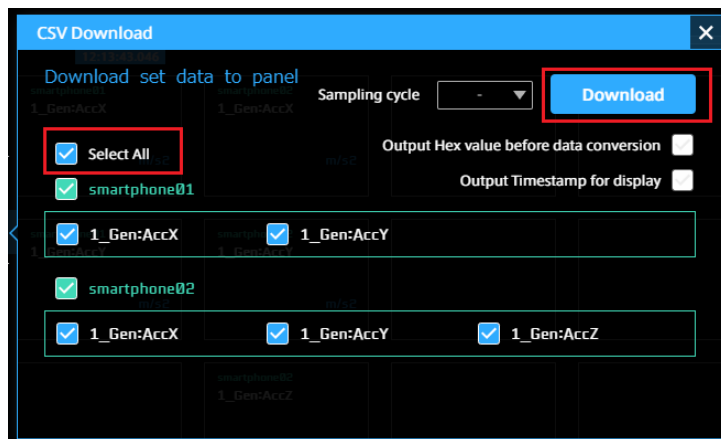
```
"#timestring", "#timestamp", "51_Analog_p5V:ch0@51_apr_an[edge1]"  
" '2022/04/08 14:54:50.214403", "1649397290.214403", 1.0090028229190506  
" '2022/04/08 14:54:50.220803", "1649397290.220803", 1.0090791180285341  
" '2022/04/08 14:54:50.227203", "1649397290.227203", 1.0090791180285341  
" '2022/04/08 14:54:50.233603", "1649397290.233603", 1.0090791180285341  
" '2022/04/08 14:54:50.240003", "1649397290.240003", 1.0090028229190506
```

**Note:** Naming rules for output files  
yyyymmddhhmmss{start date and time}-yyyymmddhhmmss{end date and time}.csv

## 13.2 CSV downloading

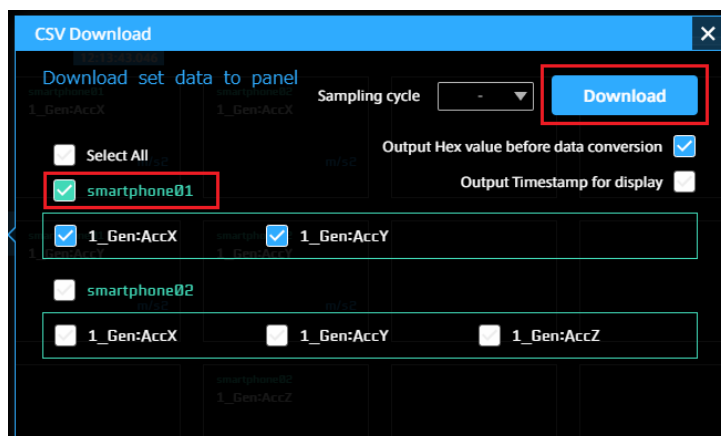
### 13.2.1 CSV downloading for data from all panels

When you check [Select All], a CSV file for data from all panels is downloaded.



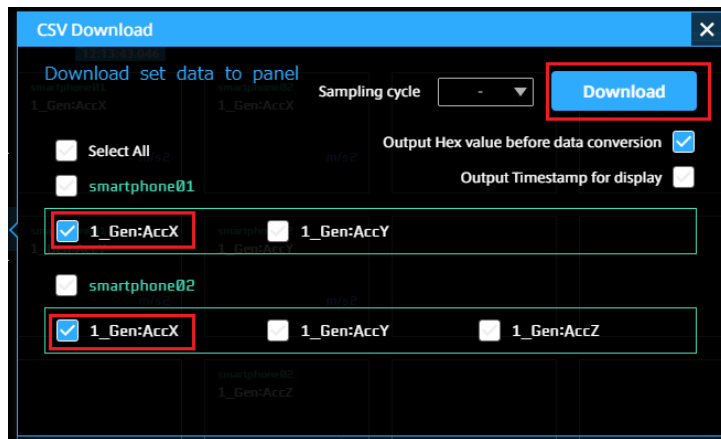
### 13.2.2 CSV downloading for each edges

When you select the edge name, a CSV file for data from the selected edge panel is downloaded.



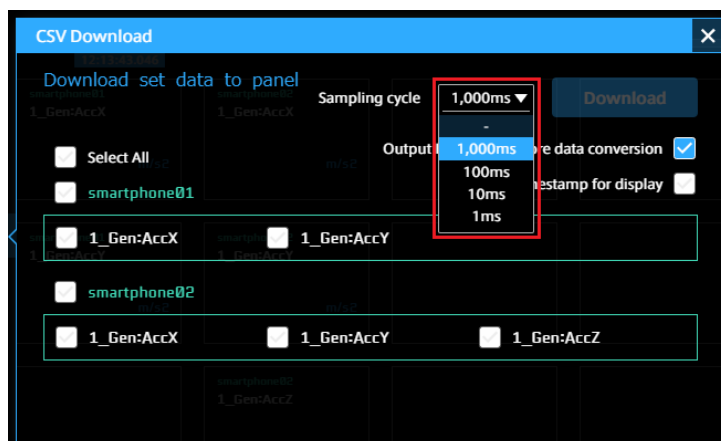
### 13.2.3 CSV downloading for each data

When you select the data name, a CSV file for the selected data is downloaded.  
Data items can be selected from different edges.



### 13.2.4 Setting the sampling period

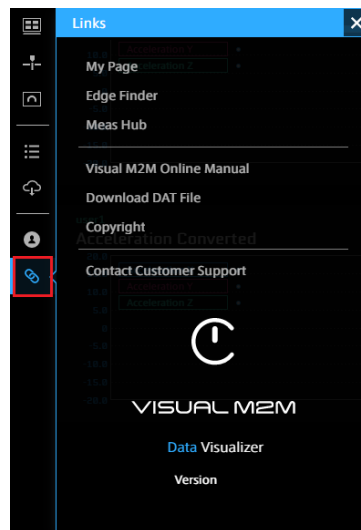
You can use the "Sampling Cycle" box to set the sampling period of the data. Data will be outputted at the rate determined by the specified sampling period.  
The value at the most recent time in the period will be set as the value of the data.  
If there is no preceding data, the data will be set as blank.



Sampling period values: - (none), 1000 ms, 100 ms, 10 ms, 1 ms

## 14 Links

Links contains links to other applications and the data settings download page. It also displays the version of this product. However, depending on your environment, links to other applications may not be displayed.



### My Page

Open My Page for configuring your user account and the edge accounts you own.

### Edge Finder

Open the Edge Finder for a quick look at the real-time traffic coming from the edge.

### Meas Hub

Open the Meas Hub for searching and managing time series data.

### Visual M2M online Manual

Open the manual PDF (this manual).

### Download DAT File

Open the download page of the data settings file (DAT). The DAT files can be imported and used in the Data Settings screen. For details, refer to [Data settings](#) (p. 20).

### Copyright

Displays the license of the software that Data Visualizer is using.

### Contact Customer Support

Create an inquiry email to the support desk.

### Version

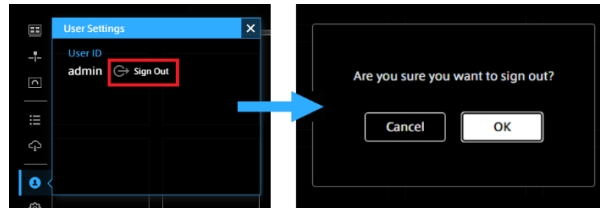
Displays the version of the Data Visualizer.

## 15 User Settings

### 15.1 Signing out

---

1. Select [User settings] from the function menu, and then click [Sign out].
2. Click [OK] in the sign-out message dialog box.

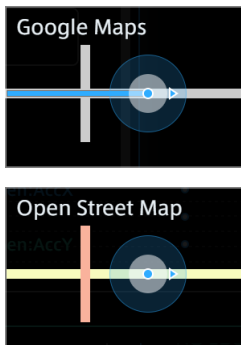




## 16 How to use visual parts

### 16.1 Map

#### 16.1.1 Google Maps and Open Street Map



There are two visual parts that display a location on a map using latitude and longitude data: Google Maps and Open Street Map.

The difference between Google Maps and Open Street Map in Data Visualizer is as follows.

|                             | Google Maps                                                                                                                                                                                                                       | Open Street Map                                                                                                                                                                                               |
|-----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Map data                    | Map data provided by Google                                                                                                                                                                                                       | By default, map data provided by Open Street Map tile server ( <a href="https://tile.openstreetmap.org/{z}/{x}/{y}.png">https://tile.openstreetmap.org/{z}/{x}/{y}.png</a> ). You can change the tile server. |
| Switching Map Types         | You can switch between several map types (Satellite, Dark, etc.) by mouse operation.                                                                                                                                              | Various maps provided in Open Street Map format can be used by changing the settings of the map data source (tile server) in Panel Settings.                                                                  |
| API key to use the map data | For intdash servers operated by aptpod, no API key setting is required.<br>If you are running your own intdash server, you will need to set up an API key (refer to the document on building an intdash server for instructions). | Default maps can be used without an API key.<br>If you want to use map data that requires an API key, enter the URL that contains the API key when setting the source (tile server) of the map data.          |

### Data to be bound to Google Maps or Open Street Map

You can bind latitude, longitude, direction, and other data to a Google Maps or Open Street Map visual part. Latitude and longitude are required, the others are optional.

- Binding latitude and longitude will display the location on the map.
- Binding the direction will display the direction of the edge on the map.
- Binding any other data will display the value (only one) in a callout on the map.

### Latitude, longitude, and direction

If the Data ID (or Data Name) of the bound data contains specific keywords, it is recognized as data representing latitude, longitude, or direction, and is used to display the position on the map.

The keywords are as follows. For example, if the Data ID or Data Name contains the keyword "LAT," it is recognized as latitude.

- Latitude: LAT
- Longitude: LNG or LON
- Direction: HEAD or DIRECTION

If you use the data settings for NMEA or General Sensor downloaded from [Links] > [Download DAT File], bind the following data. (In the downloaded data settings, "x" is the channel number.)

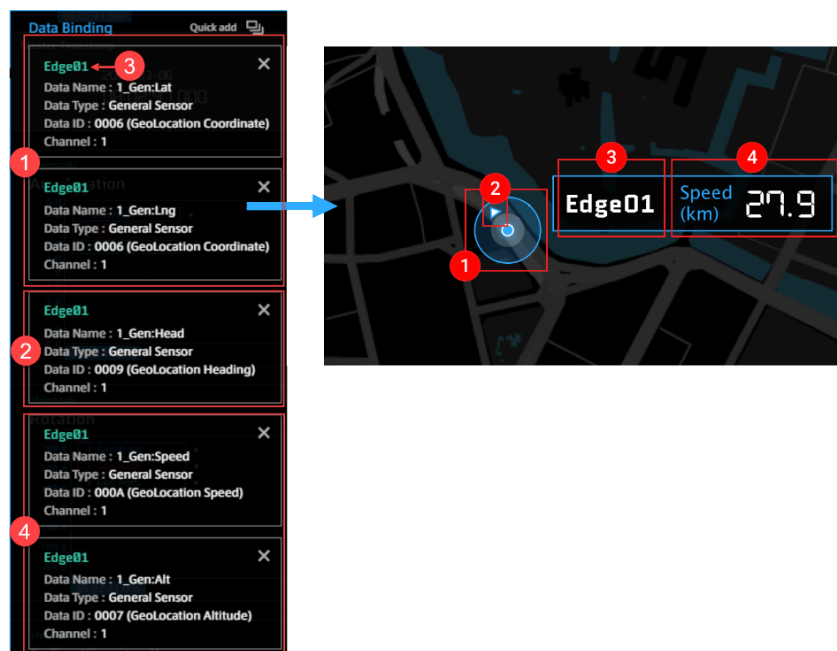
|                            | Latitude  | Longitude | Direction       |
|----------------------------|-----------|-----------|-----------------|
| NMEA (GPS)                 | x_RMC_Lat | x_RMC_Lng | x_RMC_Direction |
| GeneralSensor (Smartphone) | x_Gen:Lat | x_Gen:Lng | x_Gen:Head      |

### Other data

You can also bind data other than latitude, longitude, and direction. The first data except latitude, longitude, and direction is displayed in a box on the map.

### Example of setting and display

In the following example, latitude (Lat), longitude (Lng), and direction (Head) are bound to the map. Other than those, speed (Speed) and altitude (Alt) are bound to the map but only the first data (speed) is displayed in a callout box on the map.





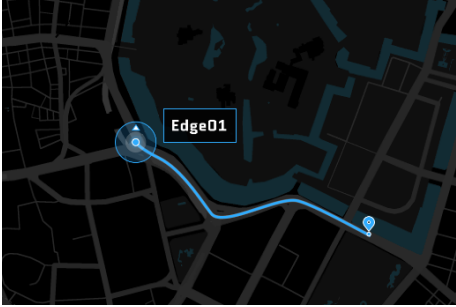



1 Edge location (latitude, longitude), 2 Edge direction, 3 Edge name, and 4 Other data

**Note:** If no edge is displayed on the map

- Confirm that the latitude and longitude data are set.
- Confirm that the data and measurement edge channels are the same. If they are different, the edge cannot be displayed.
- Make sure the edge and Data Visualizer are both communicating with the server.

### 16.1.2 Window operation

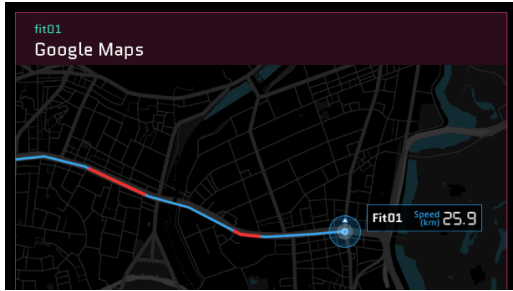

When you mouse over the map panel, a list of operation icons appears at the bottom right of the panel.

| Icon                                                                                                    | Operation                                                                                                                                          |
|---------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|
| <br>(Google Maps only) | Click to select the Map Type (Satellite, Dark, etc.).                                                                                              |
|                        | When this is set to ON, the trajectory is displayed.<br>          |
|                        | Changes the edge displayed at the center of the window. Displays all edges, or focuses on a particular edge.                                       |
|                      | Zoom in/out on the map.                                                                                                                            |
|                      | When this is set to ON, the map is displayed in full screen on the back of the screen. When this is set to OFF, the map is displayed in the panel. |

### 16.1.3 Panel Settings

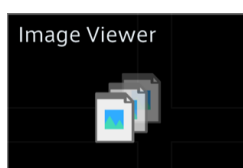
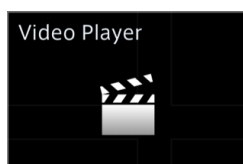
| Setting item | Required / Optional | Settings                                                                        |
|--------------|---------------------|---------------------------------------------------------------------------------|
| Panel Name   | Optional            | Enter the name to be displayed on the panel.                                    |
| Bind Data    | Required            | See <a href="#">Data to be bound to Google Maps or Open Street Map</a> (p. 62). |

### 16.1.4 Panel Option

| Setting item                                        | Required / Optional | Settings                                                                                                                                                                                                                                                                                                                                                                 |
|-----------------------------------------------------|---------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Threshold                                           | Optional            | <p>When turned on, if the data displayed in the callout box exceeds the threshold, the trajectory turns red. For more information on setting the threshold, refer to <a href="#">Setting the display format (Display Settings)</a> (p. 27).</p>                                        |
| Custom Tile Server URL (Open Street Map only)       | Optional            | <p>To change the source of the map data, enter the tile server URL, including variables such as {x}, {y}, and {z} in the URL. Example: <code>https://{s}.example.com/{z}/{x}/{y}.png</code><br/>If not specified, the default tile server URL <code>https://tile.openstreetmap.org/{z}/{x}/{y}.png</code> will be used.</p>                                              |
| Custom Copyright Attribution (Open Street Map only) | Optional            | <p>Enter the credit you want to display in the lower right corner of the map. HTML can be used. Example: <code>© &lt;a href="http://www.example.com/copyright"&gt;Example&lt;/a&gt; contributors</code><br/>If not specified, the default tile server credentials will be used.</p>  |

## 16.2 Media (Video and audio)

### 16.2.1 Video Player (for H.264) and Image Viewer (for Motion JPEG)

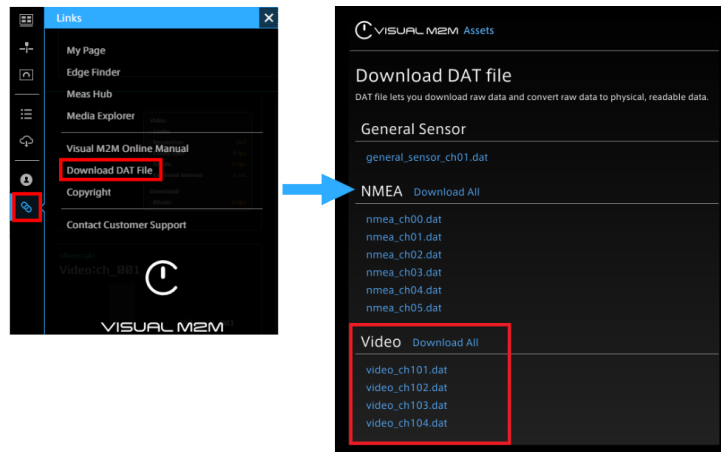


Video Player and Image Viewer display video. Use the appropriate visual parts for the codec of the video.

- Use Video Player for H.264.
- Use Image Viewer for Motion JPEG (MJPEG).

To display video, the data setting for video (data type "VIDEO(H.264,JPEG)") is required.

Download and import a settings file (.dat) or create settings on the Data Settings screen. If you download the settings, be sure to download data settings for the correct channel. For example, the settings file for channel 1 is video\_ch001.dat.



The same data settings can be used for H.264 and Motion JPEG.

**Note:** Set up visual parts and channels correctly

All of the following must be done correctly to display video.

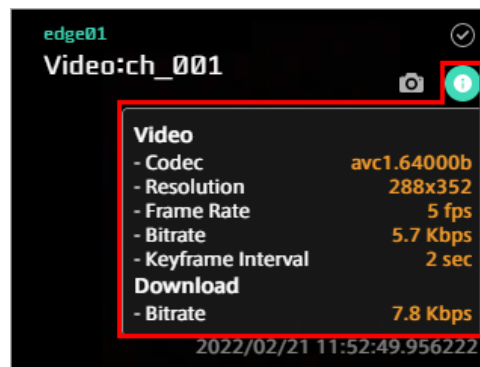
- Use Video Player for H.264 and Image Viewer for Motion JPEG.
- Use data settings for the correct channel
- Bind correct data

## Operation of Video Player and Image Viewer

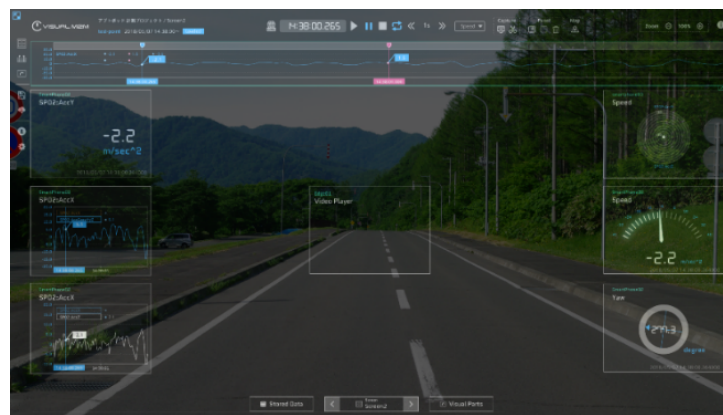


**1** Downloads the currently displayed image as a still image file. The file will be saved in the resolution of the original data, regardless of the current display size.

**2** (Video Player only) Displays information about the video, where Bitrate in Video indicates the bit rate of the video at the time it was shot, and Bitrate in Download indicates the bit rate at which the Data Visualizer is currently downloading the video from the intdash server.



**3** Displays this video as the background of the dashboard. Click the same button again to return to the original view.



**Note: Aspect Ratio**

The visible area of the video is affected by the aspect ratio of the panel. Adjust the panel size according to the ratio of the video. For details on panel size, see [Changing the panel size](#) (p. 35).

**Note: Downloading video**

Videos acquired with H.264 codec can be downloaded from the measurement details screen of the Meas Hub application. In this case, the video is downloaded as an MP4 file and does not contain any audio or timestamp by intdash.

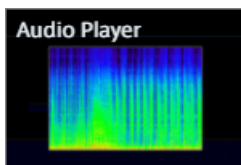
## Panel Settings

| Setting item    | Required / Optional | Settings                                                                                                                                                                                                                                                                                      |
|-----------------|---------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Panel Name      | Optional            | Enter the name to be displayed on the panel.                                                                                                                                                                                                                                                  |
| Bind Data       | Required            | Select the data source (edge) and the data you wish to display (data type "VIDEO(H.264,JPEG)").                                                                                                                                                                                               |
| Rendering Speed | Required            | The update frequency. Default is 20 fps.<br>Increasing the Rendering Speed increases the processing load.<br>If the processing load is too high, the panel may not be updated at the specified frequency.<br>During LIVE playback, the Rendering Speed of the Image Viewer cannot be changed. |

## Panel Option

| Setting item                     | Required / Optional | Settings                                                                                                                                                                                                                                                                                                                                                                                                             |
|----------------------------------|---------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Time Offset or Start Time Offset | Optional            | Playback start time can be adjusted. If the time of the video is out of sync with other data, you can offset the video to align it with other data (Minimum unit: 0.01s).                                                                                                                                                                                                                                            |
| Hardware Acceleration            | Optional            | (Video Player only) Specifies whether hardware acceleration is used for video playback. <ul style="list-style-type: none"> <li>Use Browser Setting: Follows the web browser setting.</li> <li>No Hardware Acceleration: Hardware acceleration is not used.</li> </ul> Hardware acceleration may enable smoother video playback, but the effect depends on the video to be played back and the performance of the PC. |
| Show Video info on Panel         | Optional            | (Video Player only) When turned on, information about the video is displayed on the panel.                                                                                                                                                                                                                                                                                                                           |

## 16.2.2 Audio Player

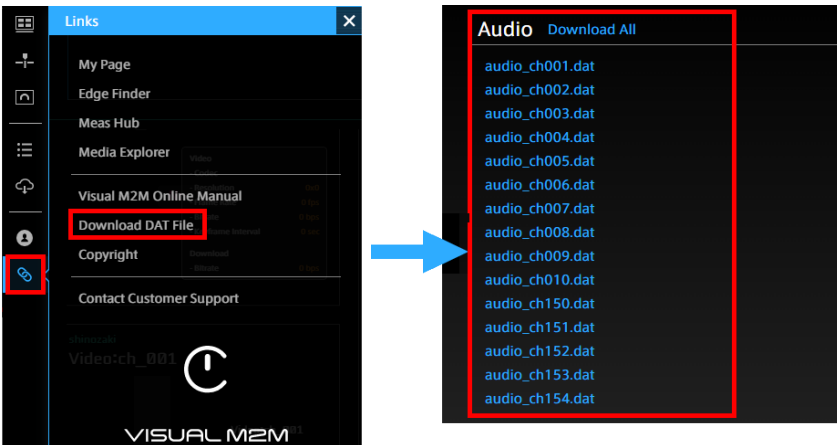


Audio Player plays audio and displays a spectrogram.

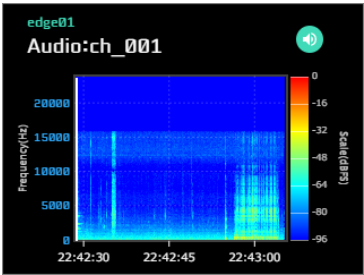
To playback audio, data settings for audio (data type "AUDIO(PCM,AAC)") are required.


Download and import a settings file (.dat) or create settings on the Data Settings screen. If you download the settings, be sure to download the data settings for the correct channel. For example, the settings file for channel 1 is audio\_ch001.dat.





Operating the Audio Player



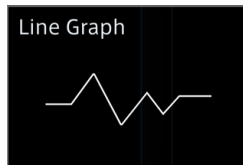
Click  to mute/unmute audio.

Panel Settings

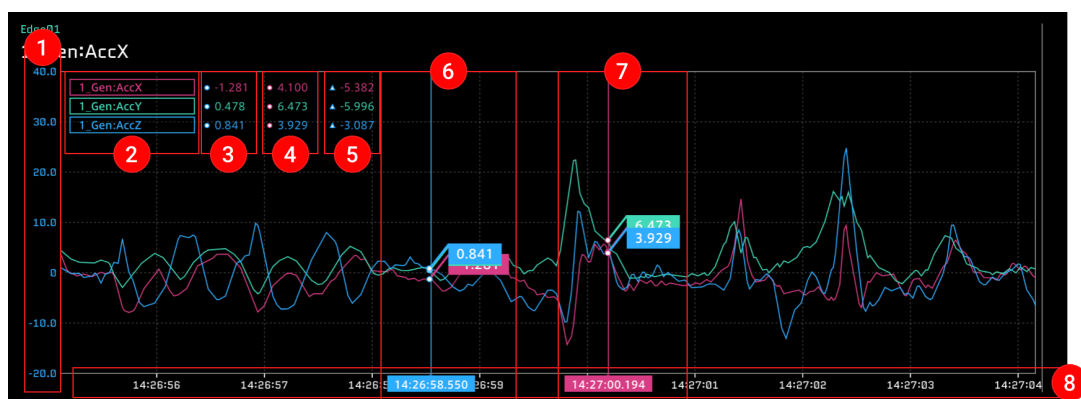
| Setting item    | Required / Optional | Settings                                                                                                                                                                                                                                                                                    |
|-----------------|---------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Panel Name      | Optional            | Enter the name to be displayed on the panel.                                                                                                                                                                                                                                                |
| Bind Data       | Required            | Select the data source (edge) and the data you wish to display (data type "AUDIO(PCM,AAC)").                                                                                                                                                                                                |
| Rendering Speed | Required            | The update frequency. Default is 20 fps.<br>Increasing the Rendering Speed increases the processing load.<br>If the processing load is too high, the panel may not be updated at the specified frequency.<br>This setting is for the spectrogram and does not affect the audio played back. |

## 16.3 Graph

### 16.3.1 Line Graph



### 16.3.2 Description of the window

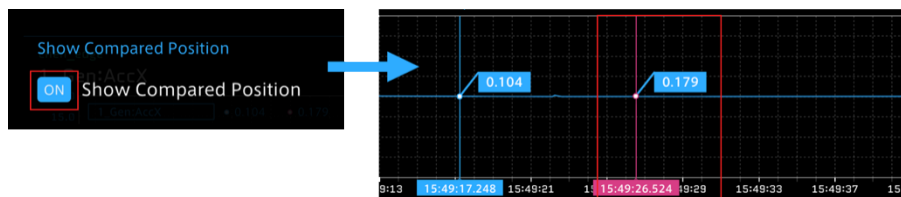


\* Up to 10 data items can be bound.

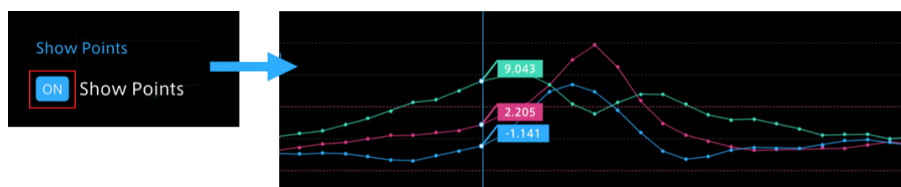
- 1 The vertical axis that represents the data value. This can be set with the [Data Range] item in the Panel Option window.
- 2 Field name of the data. You can click these items to show or hide the data. For details, see [Showing or hiding data](#) (p. 73)
- 3 Value of Current Position.
- 4 Value of Compared Position.
- 5 Difference value obtained by subtracting the value of Compared Position from the value of Current Position.
- 6 Current Position (instantaneous value).
- 7 Compared Position (comparison position).
- 8 The horizontal axis that represents time. This can be set with the [Time (X) Interval] item in the Panel Option window.

### 16.3.3 Panel Option

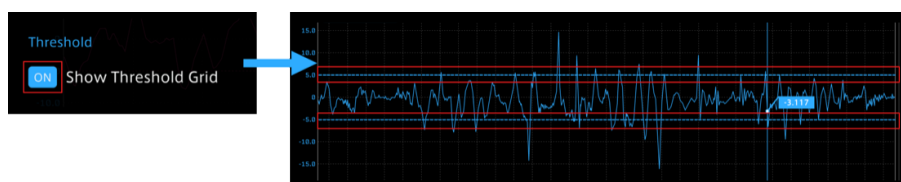
| Setting item           | Required / Optional | Settings                                                                                                                                                                              |
|------------------------|---------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Data Range             | Optional            | Set the maximum and minimum values of the vertical axis. Multiple scales can be displayed on the left scale only when [Relative (relative display)] is set in the [Graph Scale] item. |
| Show Compared Position | Optional            | ON: Compared Position is displayed.                                                                                                                                                   |



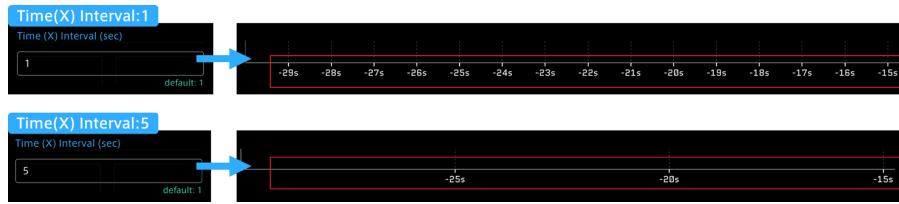
| Setting item | Required / Optional | Settings                                                                                                                        |
|--------------|---------------------|---------------------------------------------------------------------------------------------------------------------------------|
| Show Points  | Optional            | ON: Sampling points are displayed when the display range is specified. They are not displayed if the display range is too wide. |



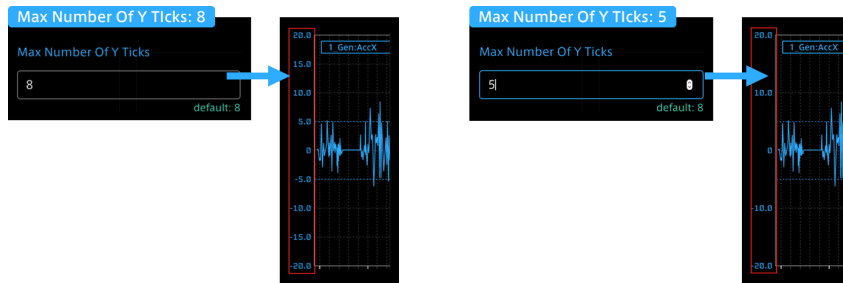
| Setting item | Required / Optional | Settings                                          |
|--------------|---------------------|---------------------------------------------------|
| Threshold    | Optional            | ON: The threshold grid set for data is displayed. |



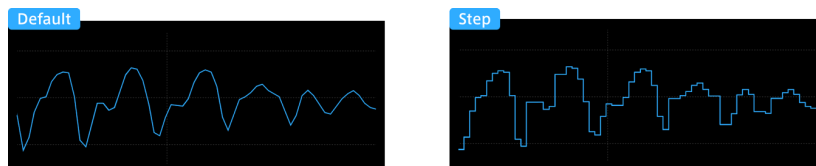
| Setting item            | Required / Optional | Settings                                  |
|-------------------------|---------------------|-------------------------------------------|
| Time (X) Interval (sec) | Optional            | Set the interval for the horizontal axis. |



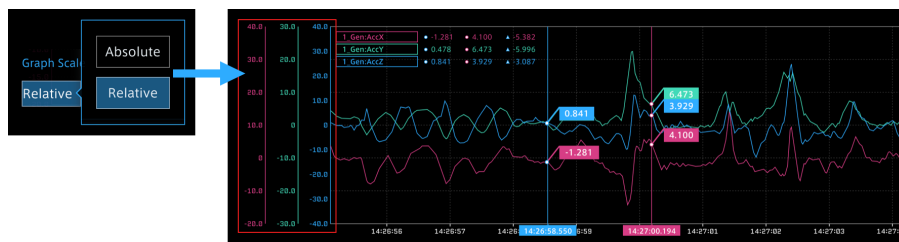
| Setting item          | Required / Optional | Settings                                                               |
|-----------------------|---------------------|------------------------------------------------------------------------|
| Max Number of Y Ticks | Optional            | Maximum number of scales on the vertical axis. The default value is 8. |



| Setting item        | Required / Optional | Settings                                                                         |
|---------------------|---------------------|----------------------------------------------------------------------------------|
| Graph Interpolation | Optional            | Set the data interpolation method.<br>Default: Line graph<br>Step: Stepped graph |

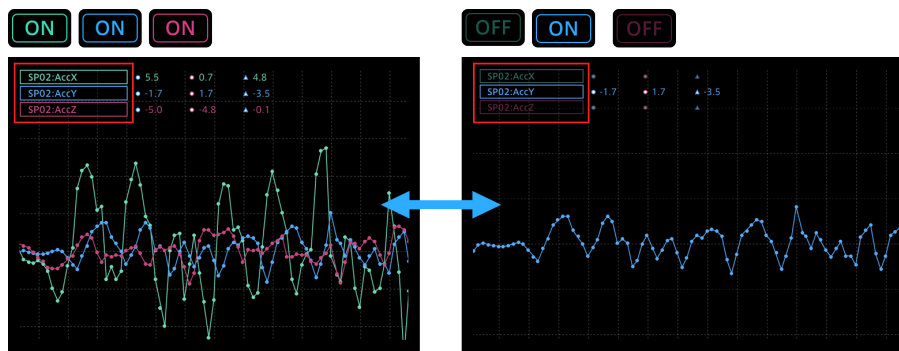


| Setting item | Required / Optional | Settings                                                                                                                                                                                                                                        |
|--------------|---------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Graph Scale  | Optional            | Set the display scale of the graph.<br>Absolute: Absolute value display. All data items are displayed on the same scale.<br>Relative: Relative display. The Y axis for each data item is displayed, and the graph is drawn using its own scale. |



### 16.3.4 Showing or hiding data

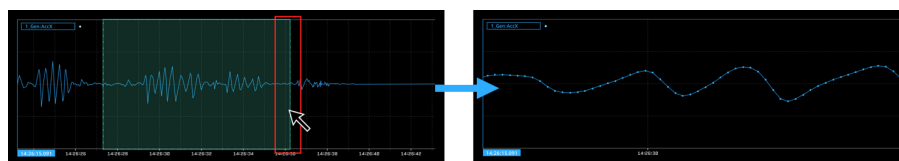
When multiple data items are bound, the line graphs are displayed for all the data items. You can show or hide line graphs by clicking Field Name of each data item. The Field Name for a hidden data item is faded out.



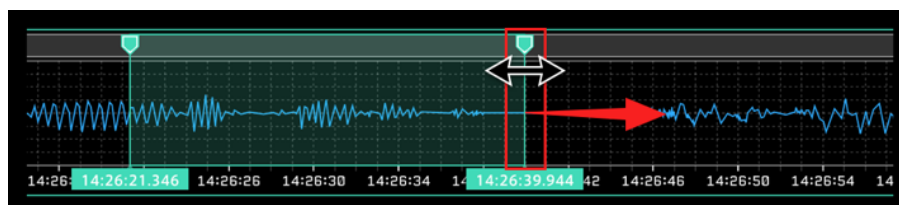
### 16.3.5 Narrowing the display range of Line Graph


#### 1. Operation on the graph

Click anywhere in the graph display area, and then drag it to the right or left.



#### 2. Operation on the timeline



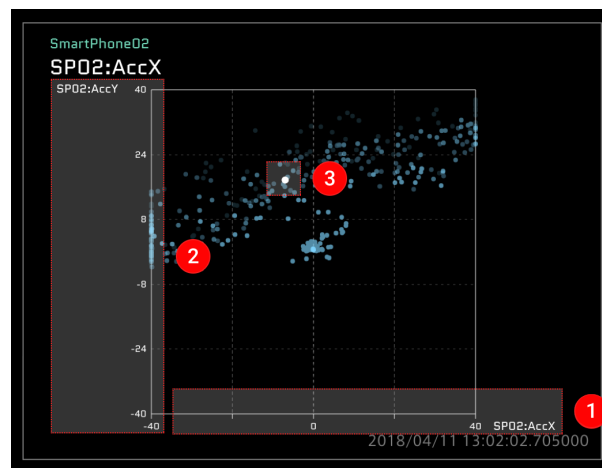
To return to the whole graph display, cancel the range specification by using the  button in the menu displayed in the upper right when hovering the mouse over the green cursor (timeline).

For details, see [Specifying the timeline range](#) (p. 44).

### 16.3.6 Scatter

Scatter displays a scatter plot. Bind two data items to one scatter plot.

If you specify the display range by dragging on the timeline, the scatter plot is displayed only with the data in the specified range. For details about specification of the timeline range, see [Specifying the timeline range](#) (p. 44).



#### Description of the window

- ❶ Data01 is displayed as the X axis.
- ❷ Data02 is displayed as the Y axis.
- ❸ The instantaneous value is displayed.

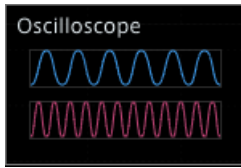
#### Panel Settings

| Setting item    | Required / Optional | Settings                                                                                                                                                                                              |
|-----------------|---------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Panel Name      | Optional            | Enter the name to be displayed on the panel.                                                                                                                                                          |
| Bind Data       | Required            | Select the device where the data is collected (edge) and the data you want to display. Two data items are always necessary.                                                                           |
| Rendering Speed | Required            | The update frequency. The default is 10 fps. Increasing the value of Rendering Speed increases the processing load. If the load is too high, the panel may not be updated at the specified frequency. |

#### Panel Option

| Setting item        | Required / Optional | Settings                                                                         |
|---------------------|---------------------|----------------------------------------------------------------------------------|
| Data Range - X Axis | Optional            | Set the maximum and minimum values that can be displayed on the X axis (Data01). |
| Data Range - Y Axis | Optional            | Set the maximum and minimum values that can be displayed on the Y axis (Data02). |

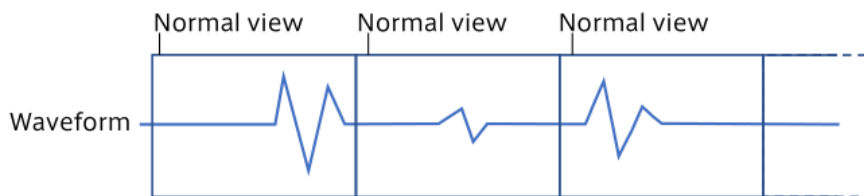
### 16.3.7 Oscilloscope



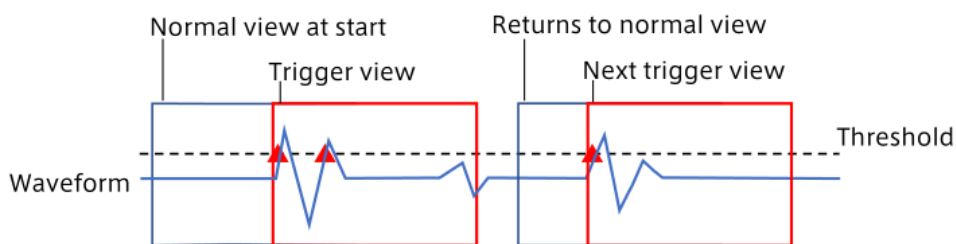
The Oscilloscope is a visual part for displaying repeated waveforms. When using the Line Graph visual part, the waveform of the entire measurement or selected range is displayed, whereas in Oscilloscope, the waveform of the specified short time range (Time Window) is cut out and displayed. As time passes, the display will be updated with the waveform of the new data.

In Oscilloscope, "trigger view" is possible by setting thresholds on the Data Settings screen, which makes it possible to display the waveform in an easy-to-see format. A trigger occurs when the value is greater than the upper threshold or less than the lower threshold. When a trigger occurs, the waveform drawing area is updated from the left end. The waveform display in such case is called trigger view.

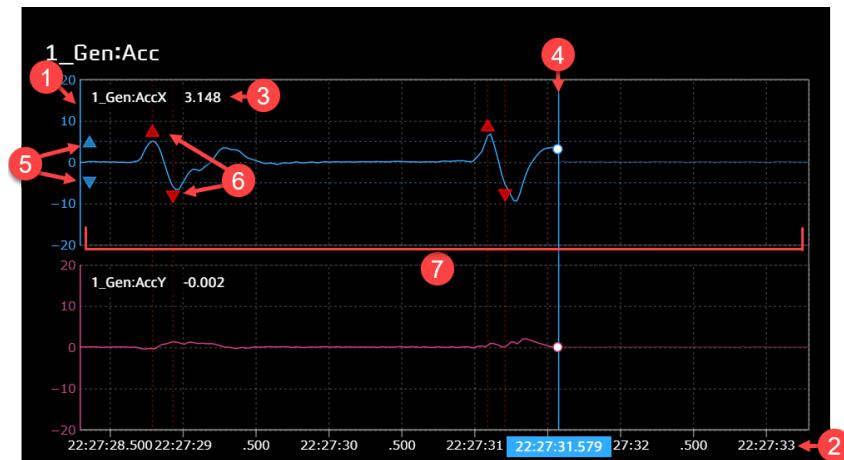
When a threshold is not set:




When a threshold is set:



## Description of the window



Up to 8 data can be bound.

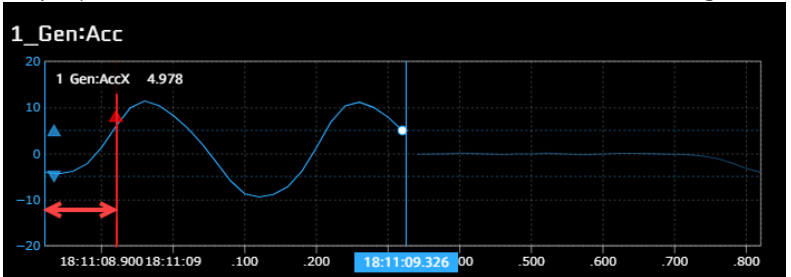
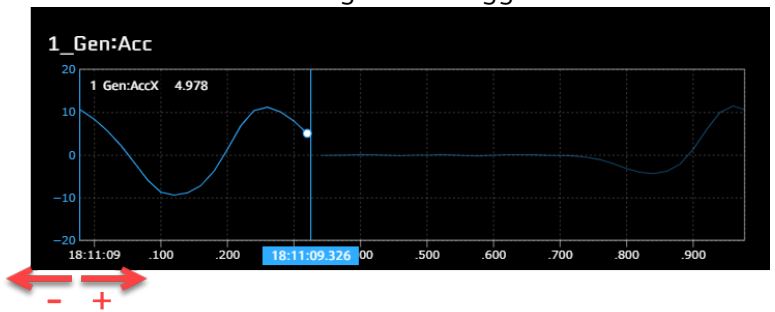
- ❶ Vertical axis. The range to be displayed can be set with the [Data Range] item in the Panel Option window.
- ❷ Horizontal axis representing time. The displayed time range can be set in the [Time Window] of the Panel Option window.
- ❸ Data name and current value.
- ❹ Current position.
- ❺ Thresholds used as triggers (Threshold set in  Data Settings).
- ❻ A trigger marker ( ▲ ▼ ) indicating that the value exceeds the threshold, and a trigger has occurred. Hover your mouse over the trigger marker to see when the trigger occurred.
- ❼ Waveform drawing area.

## Panel Settings

| Setting item    | Required / Optional | Settings                                                                                                                                                                                                  |
|-----------------|---------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Panel Name      | Optional            | Enter the name to be displayed on the panel.                                                                                                                                                              |
| Bind Data       | Required            | Select the device where the data is collected (edge) and the data you want to display.                                                                                                                    |
| Rendering Speed | Required            | The update frequency. Default is 20 fps.<br>Increasing the Rendering Speed increases the processing load.<br>If the processing load is too high, the panel may not be updated at the specified frequency. |



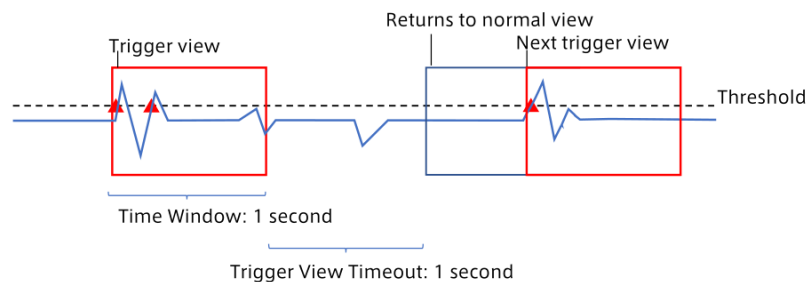
## Panel Option

| Setting item               | Required / Optional | Settings                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|----------------------------|---------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Data Range                 | Optional            | Set the maximum and minimum values on the vertical axis.                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Time Window (sec)          | Optional            | Set the length of the time range displayed on the horizontal axis.                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Trigger Position (%)       | Optional            | <p>Set the position where the trigger is displayed in the waveform drawing area.</p> <p>For example, if the Trigger Position is 10%, the trigger will be displayed 10% from the left end of the waveform drawing area.</p>                                                                                                                                                                                         |
| Trigger View Timeout (sec) | Optional            | <p>When a trigger occurs, the Oscilloscope switches to the trigger view, but after a certain period of time, it returns to the normal view. Trigger View Timeout sets the time until the waveform returns to the normal view after it reaches the right edge in the trigger view.</p> <p>For example, if Trigger View Timeout is set to 1 second, the current trigger view will be maintained for 1 second after the waveform reaches the right edge. After that, it returns to the normal view.</p> |
| Trigger Holdoff (sec)      | Optional            | Set the minimum time from one trigger to the next. No trigger will occur within this time.                                                                                                                                                                                                                                                                                                                                                                                                           |
| Time Offset (sec)          | Optional            | <p>Shifts the display time range. For example, setting the Time Offset to -0.2 shifts the display time range 0.2 seconds to the left.</p> <p>This setting is valid only for the normal view. Use Trigger Position to shift the time range in the trigger view.</p>                                                                                                                                               |

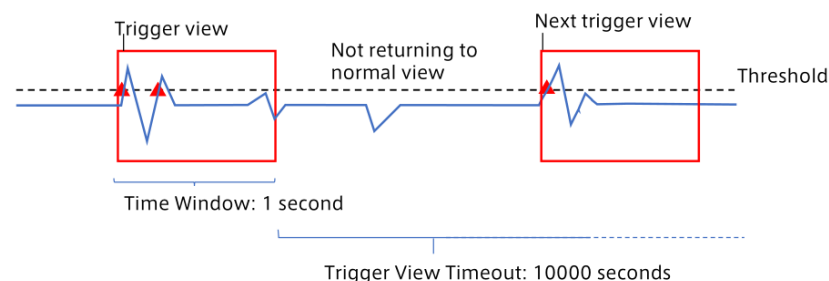
**Note:** Update the display only when the threshold is exceeded

The trigger view automatically returns to the normal view after the time set by Trigger View Timeout has elapsed. If you do not need to return to the normal view and want to check only the waveform when the trigger occurs, set a large value (for example, 10000 seconds) for Trigger View Timeout. This allows you to postpone the timing of returning to normal view so that the display does not update until a trigger occurs.

**Example when Trigger View Timeout is set to a small value:**



**Example when Trigger View Timeout is set to a large value (Updates the display only when the threshold is exceeded):**

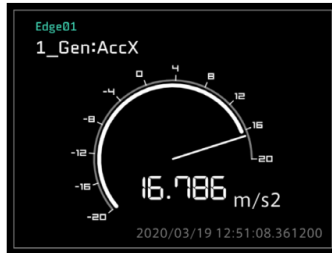


## 16.4 Meter

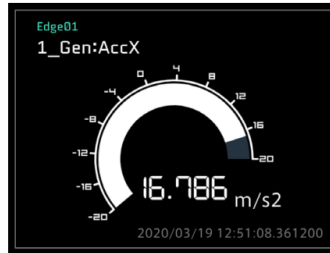
### 16.4.1 Various basic meters

The following types of meters display one piece of bound data. Of these meters, Bar Meter and Zero Based Meter display the midpoint between minimum and maximum values (as set in Panel Option) at the center as the reference point. Zero Based Meter shows the difference from the reference point with a bar.

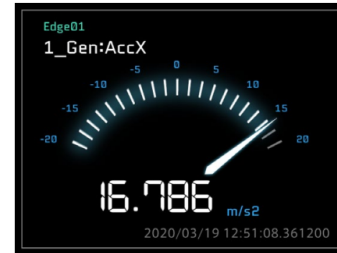
Arc Instrument



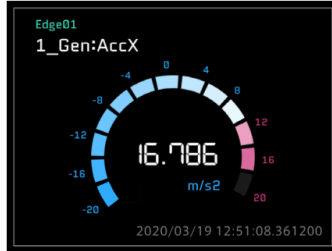
Arc Meter



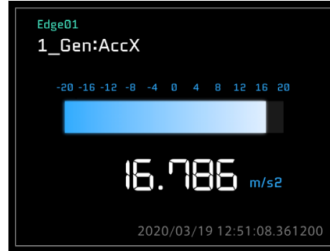
Arc Instrument001



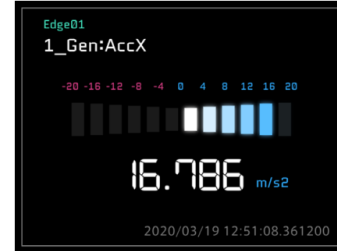
Arc Subdivision Meter



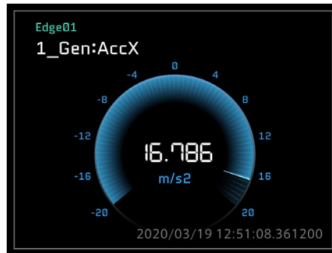
Bar Meter



Zero Based Meter



Radial Gauge Meter



## Panel Settings

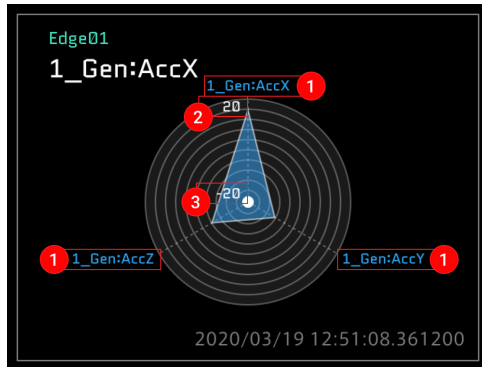
| Setting item    | Required / Optional | Settings                                                                                                                                                                                                  |
|-----------------|---------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Panel Name      | Optional            | Set the name to be displayed on the panel.                                                                                                                                                                |
| Bind Data       | Required            | Select the device where the data is collected (edge) and the data you want to display.                                                                                                                    |
| Rendering Speed | Required            | The update frequency. Default is 20 fps.<br>Increasing the Rendering Speed increases the processing load.<br>If the processing load is too high, the panel may not be updated at the specified frequency. |

## Panel Option

| Setting item      | Required / Optional | Settings                                         |
|-------------------|---------------------|--------------------------------------------------|
| Data Range - Axis | Optional            | Set the maximum and minimum values of the meter. |
| Ticks             | Optional            | Set the number of ticks of the meter.            |

## 16.4.2 Radar Chart

Radar Chart displays multiple data items on a radar chart. Up to 10 data items can be bound to one radar chart.



### Description of the window

- 1 The set data name is displayed.
- 2 The max Data Range of Data01 is displayed (this can be changed with Data Range of Panel Option).
- 3 The min Data Range of Data01 is displayed (this can be changed with Data Range of Panel Option).

**Note:** The maximum and minimum values of a radar chart can be set only for Data01.

### Panel Settings

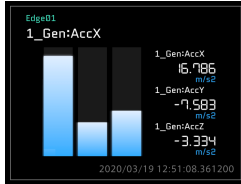
| Setting item    | Required / Optional | Settings                                                                                                                                                                                                  |
|-----------------|---------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Panel Name      | Optional            | Set the name to be displayed on the panel.                                                                                                                                                                |
| Bind Data       | Required            | Select the device where the data is collected (edge) and the data you want to display.                                                                                                                    |
| Rendering Speed | Required            | The update frequency. Default is 20 fps.<br>Increasing the Rendering Speed increases the processing load.<br>If the processing load is too high, the panel may not be updated at the specified frequency. |

### Panel Option

| Setting item      | Required / Optional | Settings                                             |
|-------------------|---------------------|------------------------------------------------------|
| Data Range - Axis | Optional            | Set the maximum and minimum values of a radar chart. |
| Ticks             | Optional            | Set the number of scales of a radar chart.           |

### 16.4.3 Vertical Bar Meter

Vertical Bar Meter displays multiple data items in a bar graph. Up to 3 data items can be bound to one Vertical Bar Meter panel. You can set a different Data Range for each data.



#### Panel Settings

| Setting item    | Required / Optional | Settings                                                                                                                                                                                                  |
|-----------------|---------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Panel Name      | Optional            | Set the name to be displayed on the panel.                                                                                                                                                                |
| Bind Data       | Required            | Select the device where the data is collected (edge) and the data you want to display.                                                                                                                    |
| Rendering Speed | Required            | The update frequency. Default is 20 fps.<br>Increasing the Rendering Speed increases the processing load.<br>If the processing load is too high, the panel may not be updated at the specified frequency. |

#### Panel Option

| Setting item   | Required / Optional | Settings                                                     |
|----------------|---------------------|--------------------------------------------------------------|
| Data Range - 1 | Optional            | Set the maximum and minimum values of the display of Data01. |
| Data Range - 2 | Optional            | Set the maximum and minimum values of the display of Data02. |
| Data Range - 3 | Optional            | Set the maximum and minimum values of the display of Data03. |

### 16.5 Label

Label displays numeric values and character strings. Bind one data item to one Label panel.



| Visual parts  | Function                                                                                                                             |
|---------------|--------------------------------------------------------------------------------------------------------------------------------------|
| Value Current | Displays the current value.                                                                                                          |
| Value Average | Displays the average value in the loaded data. If you specify a range on the timeline, the average value in that range is displayed. |
| Value Min     | Displays the minimum value in the loaded data. If you specify a range on the timeline, the minimum value in that range is displayed. |
| Value Max     | Displays the maximum value in the loaded data. If you specify a range on the timeline, the maximum value in that range is displayed. |
| Hex Label     | Displays the current value in hex format.                                                                                            |
| Binary Label  | Displays the current value in binary format.                                                                                         |
| Text Label    | Displays the current value in text format.                                                                                           |

### 16.5.1 Panel Settings

| Setting item    | Required / Optional | Settings                                                                                                                                                                                                  |
|-----------------|---------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Panel Name      | Optional            | Set the name to be displayed on the panel.                                                                                                                                                                |
| Bind Data       | Required            | Select the device where the data is collected (edge) and the data you want to display.                                                                                                                    |
| Rendering Speed | Required            | The update frequency. Default is 20 fps.<br>Increasing the Rendering Speed increases the processing load.<br>If the processing load is too high, the panel may not be updated at the specified frequency. |

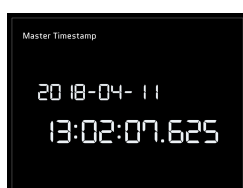
### 16.5.2 Panel Option (only for Hex Label, Binary Label)

| Setting item | Required / Optional | Settings                                            |
|--------------|---------------------|-----------------------------------------------------|
| Data Range   | Optional            | Set the maximum and minimum values to be displayed. |
| Byte Range   | Required            | Set a value between 0 and 4.                        |

## 16.6 Master (Master Timestamp)

### 16.6.1 Master Timestamp

The master timestamp, which is the reference date and time for the timeline control, is displayed.



## Panel Settings

| Setting item    | Required / Optional | Settings                                                                                                                                                                                                      |
|-----------------|---------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Panel Name      | Optional            | Set the name to be displayed on the panel.                                                                                                                                                                    |
| Bind Data       | -                   | You do not need to set Bind Data.                                                                                                                                                                             |
| Rendering Speed | Required            | The update frequency. The default is 30 fps.<br>Increasing the Rendering Speed increases the processing load.<br>If the processing load is too high, the panel may not be updated at the specified frequency. |

## Panel Option

There is no item to set.

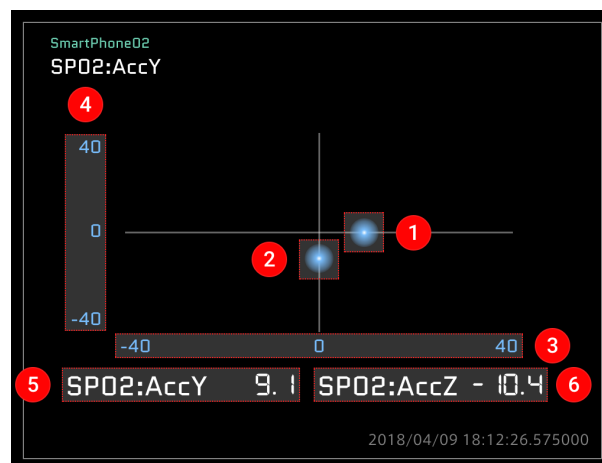
## 16.7 Position

There are six types of visual parts contained in the Position category.

### 16.7.1 Shine Ball

Shine Ball displays data on a two-dimensional (x axis and Y axis) plane. Bind two data items to one Shine Ball panel.

## Description of the window



- ❶ The instantaneous value of Data01 is displayed as a sphere.
- ❷ The instantaneous value of Data02 is displayed as a sphere.
- ❸ The Data Range set in Data01 is displayed (X axis).
- ❹ The Data Range set in Data02 is displayed (Y axis).
- ❺ The instantaneous value of Data01 is displayed.
- ❻ The instantaneous value of Data02 is displayed.

## Panel Settings

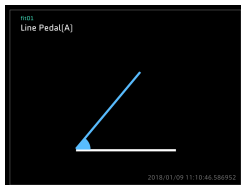
| Setting item    | Required / Optional | Settings                                                                                                                                                                                                  |
|-----------------|---------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Panel Name      | Optional            | Set the name to be displayed on the panel.                                                                                                                                                                |
| Bind Data       | Required            | Select the device where the data is collected (edge) and the data you want to display.                                                                                                                    |
| Rendering Speed | Required            | The update frequency. Default is 20 fps.<br>Increasing the Rendering Speed increases the processing load.<br>If the processing load is too high, the panel may not be updated at the specified frequency. |

## Panel Option

| Setting item        | Required / Optional | Settings                                                                         |
|---------------------|---------------------|----------------------------------------------------------------------------------|
| Data Range - X Axis | Optional            | Set the maximum and minimum values that can be displayed on the X axis (Data01). |
| Data Range - Y Axis | Optional            | Set the maximum and minimum values that can be displayed on the Y axis (Data02). |

### 16.7.2 LINE Pedal (A), (B)

LINE Pedal displays a graphic whose angle varies resembling a pedal. Bind one data item to one LINE Pedal panel.



## Panel Settings

| Setting item    | Required / Optional | Settings                                                                                                                                                                                                  |
|-----------------|---------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Panel Name      | Optional            | Set the name to be displayed on the panel.                                                                                                                                                                |
| Bind Data       | Required            | Select the device where the data is collected (edge) and the data you want to display.                                                                                                                    |
| Rendering Speed | Required            | The update frequency. Default is 20 fps.<br>Increasing the Rendering Speed increases the processing load.<br>If the processing load is too high, the panel may not be updated at the specified frequency. |



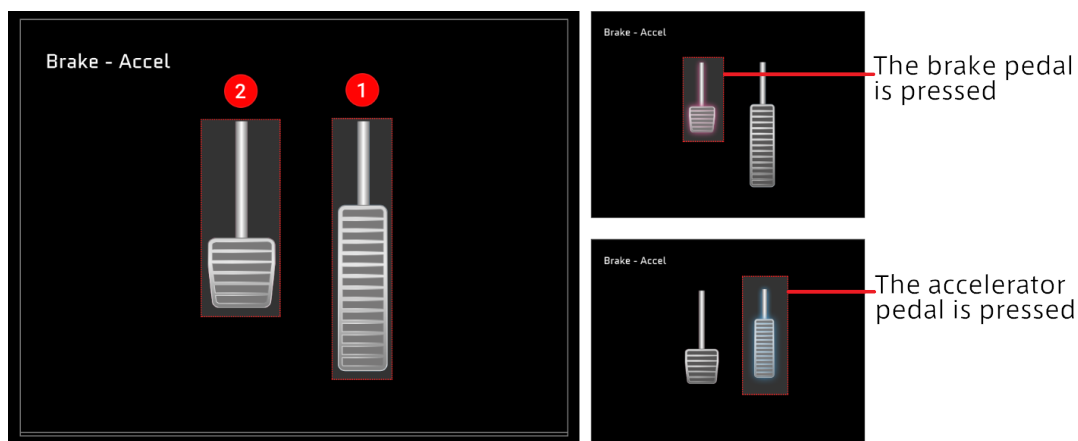
## Panel Option

| Setting item | Required / Optional | Settings                                            |
|--------------|---------------------|-----------------------------------------------------|
| Data Range   | Optional            | Set the maximum and minimum values to be displayed. |

### 16.7.3 Accel Brake Pedal

Accel Brake Pedal displays graphics resembling the vehicle accelerator pedal and brake pedal. Bind two data items for accelerator and brake to one Accel Brake Pedal panel.

#### Description of the window



- ❶ The data set in Data01 is displayed as a pedal image.
- ❷ The data set in Data02 is displayed as a pedal image.

**Note:** Setting accelerator and brake

- Set the accelerator data for Data01. Set the brake data for Data02.
- If Data01 and Data02 are set reversely, the accelerator operation and the brake operation are reversed.

## Panel Settings

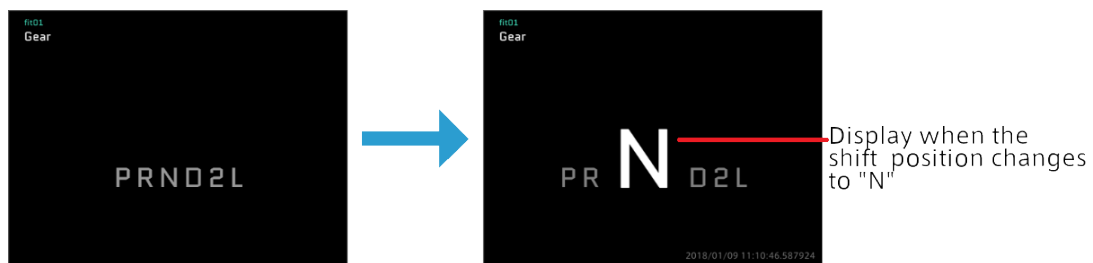
| Setting item    | Required / Optional | Settings                                                                                                                                                                                            |
|-----------------|---------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Panel Name      | Optional            | Set the name to be displayed on the panel.                                                                                                                                                          |
| Bind Data       | Required            | Select the device where the data is collected (edge) and the data you want to display. Set the accelerator data for Data01 and the brake data for Data02.                                           |
| Rendering Speed | Required            | The update frequency. Default is 20 fps. Increasing the Rendering Speed increases the processing load. If the processing load is too high, the panel may not be updated at the specified frequency. |

## Panel Option

| Setting item       | Required / Optional | Settings                            |
|--------------------|---------------------|-------------------------------------|
| Data Range - Brake | Optional            | Set the maximum and minimum values. |
| Data Range - Accel | Optional            | Set the maximum and minimum values. |

### 16.7.4 AT Gear

AT Gear displays a graphic resembling the shift indicator of an automatic transmission. Bind one data item to the AT Gear panel.



## Panel Settings

| Setting item    | Required / Optional | Settings                                                                                                                                                                                            |
|-----------------|---------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Panel Name      | Optional            | Set the name to be displayed on the panel.                                                                                                                                                          |
| Bind Data       | Required            | Select the device where the data is collected (edge) and the data you want to display.                                                                                                              |
| Rendering Speed | Required            | The update frequency. Default is 20 fps. Increasing the Rendering Speed increases the processing load. If the processing load is too high, the panel may not be updated at the specified frequency. |

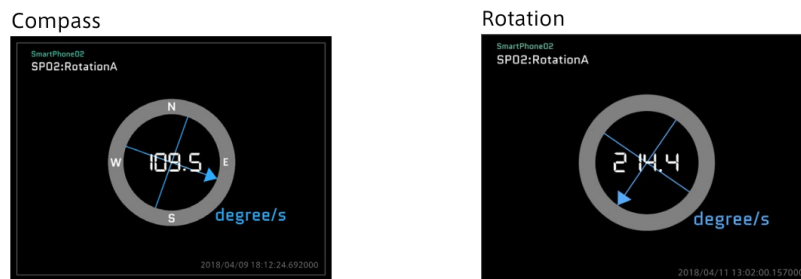
## Panel Option

There is no item to set.

## 16.8 Rotation

There are four types of visual parts contained in the Rotation category.

### 16.8.1 Compass and Rotation



Compass and Rotation display the direction. Bind one data item to the panel to display Compass or Rotation. The direction (N, E, W, S) is shown in Compass, but not in Rotation.

#### Panel Settings

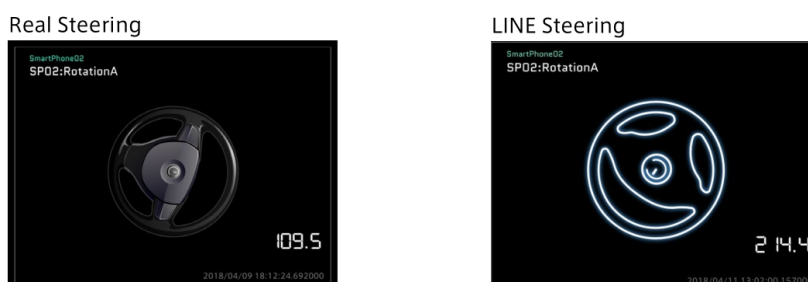
| Setting item    | Required / Optional | Settings                                                                                                                                                                                            |
|-----------------|---------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Panel Name      | Optional            | Set the name to be displayed on the panel.                                                                                                                                                          |
| Bind Data       | Required            | Select the device where the data is collected (edge) and the data you want to display.                                                                                                              |
| Rendering Speed | Required            | The update frequency. Default is 20 fps. Increasing the Rendering Speed increases the processing load. If the processing load is too high, the panel may not be updated at the specified frequency. |

#### Panel Option

There is no item to set.

### 16.8.2 Real Steering and LINE Steering

Real Steering and LINE Steering display graphics resembling the steering wheel of a vehicle. Bind one data item to the panel that displays Real Steering or LINE Steering.



## Panel Settings

| Setting item    | Required / Optional | Settings                                                                                                                                                                                                  |
|-----------------|---------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Panel Name      | Optional            | Set the name to be displayed on the panel.                                                                                                                                                                |
| Bind Data       | Required            | Select the device where the data is collected (edge) and the data you want to display.                                                                                                                    |
| Rendering Speed | Required            | The update frequency. Default is 20 fps.<br>Increasing the Rendering Speed increases the processing load.<br>If the processing load is too high, the panel may not be updated at the specified frequency. |

## Panel Option

There is no item to set.

## 16.9 Stream (list view)

There is only one type of visual part contained in the Stream category.

### 16.9.1 Text Stream

Text Stream displays the timestamps and values of data in a list format. Bind one data item to the Text Stream panel. The list of data items is displayed in descending order of timestamps.

| SmartPhone02<br>SP02:Pitch |               |
|----------------------------|---------------|
| 2018/04/09 18:12:25.192000 | 63.613481798  |
| 2018/04/09 18:12:25.176000 | 72.899444098  |
| 2018/04/09 18:12:25.159000 | 78.386845117  |
| 2018/04/09 18:12:25.142000 | 98.432113878  |
| 2018/04/09 18:12:25.126000 | 98.577786522  |
| 2018/04/09 18:12:25.109000 | 100.045916821 |
| 2018/04/09 18:12:25.093000 | 101.103591481 |
| 2018/04/09 18:12:25.076000 | 101.153507065 |
| 2018/04/09 18:12:25.059000 | 100.339443831 |
| 2018/04/09 18:12:25.043000 | 99.558239083  |
| 2018/04/09 18:12:25.026000 | 100.948390945 |
| 2018/04/09 18:12:25.009000 | 75.306162799  |
| 2018/04/09 18:12:24.993000 | 69.752000540  |
| 2018/04/09 18:12:24.976000 | 60.649156115  |
| 2018/04/09 18:12:24.959000 | 53.343019702  |
| 2018/04/09 18:12:24.943000 | 47.017121303  |
| 2018/04/09 18:12:24.926000 | 41.997817423  |

### 16.9.2 Description of the window

- ① The timestamp of Current Position is displayed (instantaneous value).
- ② The value of Current Position is displayed (instantaneous value)
- ③ The timestamp of Compared Position (comparison position) is displayed.
- ④ The value of Compared Position (comparison position) is displayed.

**Note:** Display of Compared Position

The Compared Position is displayed in red even if Show Compared Position in Timeline Settings is set to OFF.

## Panel Settings

| Setting item    | Required / Optional | Settings                                                                                                                                                                                                  |
|-----------------|---------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Panel Name      | Optional            | Set the name to be displayed on the panel.                                                                                                                                                                |
| Bind Data       | Required            | Select the device where the data is collected (edge) and the data you want to display.                                                                                                                    |
| Rendering Speed | Required            | The update frequency. Default is 20 fps.<br>Increasing the Rendering Speed increases the processing load.<br>If the processing load is too high, the panel may not be updated at the specified frequency. |

## Panel Option

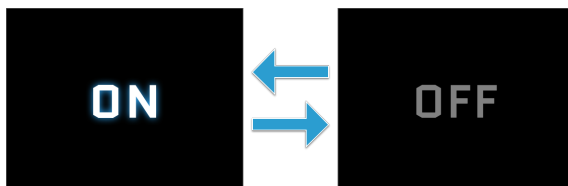
There is no item to set.

## 16.10 Switch

There are four types of visual parts contained in the Switch category. The value of one piece of bound data is displayed as ON (0) or OFF (1).

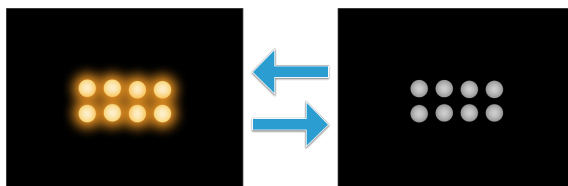
### Label Switch

The setting is displayed as "ON" or "OFF".



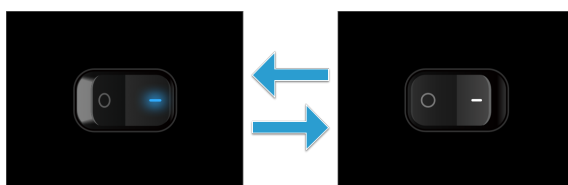
### Signal Switch

The ON/OFF setting is displayed with a glowing lamp image.



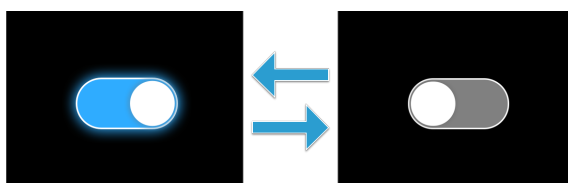
### Rocker Switch

The ON/OFF setting is displayed with a rocker switch (seesaw switch) image.



### Slide Switch

The ON/OFF setting is displayed with a slide switch image.



### 16.10.1 Panel Settings

| Setting item    | Required / Optional | Settings                                                                                                                                                                                                  |
|-----------------|---------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Panel Name      | Optional            | Set the name to be displayed on the panel.                                                                                                                                                                |
| Bind Data       | Required            | Select the device where the data is collected (edge) and the data you want to display.                                                                                                                    |
| Rendering Speed | Required            | The update frequency. Default is 20 fps.<br>Increasing the Rendering Speed increases the processing load.<br>If the processing load is too high, the panel may not be updated at the specified frequency. |

### 16.10.2 Panel Option

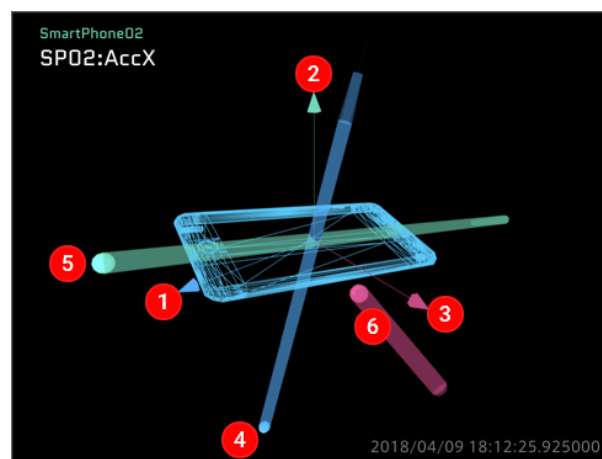
There is no item to set.

## 16.11 3D

### 16.11.1 SmartPhone

The attitude and acceleration are displayed with a smartphone graphic.

Description of the window



- ① Displays the X axis.
- ② Displays the Y axis.
- ③ Displays the Z axis.
- ④ Displays the X acceleration.
- ⑤ Displays the Y acceleration.
- ⑥ Displays the Z acceleration.

## Panel Settings

| Setting item    | Required / Optional | Settings                                                                                                                                                                                                  |
|-----------------|---------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Panel Name      | Optional            | Set the name to be displayed on the panel.                                                                                                                                                                |
| Bind Data       | Required            | Select the device where the data is collected (edge) and the data you want to display.                                                                                                                    |
| Rendering Speed | Required            | The update frequency. Default is 20 fps.<br>Increasing the Rendering Speed increases the processing load.<br>If the processing load is too high, the panel may not be updated at the specified frequency. |

## Panel Option

| Setting item      | Required / Optional | Settings                                                          |
|-------------------|---------------------|-------------------------------------------------------------------|
| model Rotation X  | Required            | Set the offset of the model X-axis rotation.                      |
| model Rotation Y  | Required            | Set the offset of the model Y-axis rotation.                      |
| model Rotation Z  | Required            | Set the offset of the model Z-axis rotation.                      |
| local Rotation X  | Required            | Set the offset of the local X-axis rotation.                      |
| local Rotation Y  | Required            | Set the offset of the local Y-axis rotation.                      |
| local Rotation Z  | Required            | Set the offset of the local Z-axis rotation.                      |
| orientation Angle | Required            | Select [euler] or [quaternion] for the posture angle.             |
| coordinate System | Required            | Select [left handed] or [right handed] for the coordinate system. |

## 17 Data Visualizer FAQ

### 17.1 Q&A about accounts

---

**Is it possible to create user information?**

User information cannot be created by Data Visualizer. Use the Edge Admin Console application.

**Is it possible to edit or delete user information?**

User information cannot be edited or deleted by Data Visualizer. Use the Edge Admin Console application.

**How can I sign out?**

Open [User Settings], and then select [Sign out].

**What should I do if I forget my login password?**

Click [Forgot Password?] in the login window, and then reissue a password.

### 17.2 Q&A about data settings

---

**What is a data settings file?**

Data Visualizer treats measurement data as binary data. A data settings file contains definition information for displaying measurement data as physical values.

**How can I add settings from a data settings file?**

Select [Import] from the Data Settings menu, and then select the file you want to add.

**How can I add/delete data to/from the registered data settings file?**

From the Data Settings menu, select [Add Group] to add a group, or [Delete Group] to delete a group. If you want to add only data, select [Add Data]. If you want to delete only data, select [Edit], and then [Delete].

### 17.3 Q&A about screen settings

---

**What is a screen?**

In Data Visualizer, a screen is a specific configuration for the display of measurement data.

**How do I save a screen?**

Screens are saved automatically. The same screen information can be used in another PC environment by executing [Export].

### 17.4 Q&A about visual parts

---

**What are the Visual Parts?**

Visual parts provide a graphical representation of measurement data. You can use Visual Parts by arranging them on screens. Visual Parts have various shapes such as graphs, movies, and meters, which provide the most suitable visualization for the characteristics and purposes of the data.

**How can I arrange Visual Parts on the screen?**

Select the part you want to display from [Visual Parts] at the bottom of the window, and then drag and drop the part to the target screen.



## 17.5 Q&A about playback

---

### How can I perform live playback?

Select [LIVE]. Then, select [Play].

### How can I replay Stored Data?

From [Stored Data], select the data you want to replay. Then, select [Play].

### How can I switch from in-progress live playback to Stored Data playback?

Select [LIVE]. The [Stored Data] window appears. Then, select the data you want to replay.

### How can I switch from in-progress Stored Data playback to live playback?

Select [LIVE]. Then, select [Play].

### Is it possible to change the playback speed?

You can adjust the playback speed by selecting the playback speed from the [Speed] list.

### Is it possible to replay only the data within a particular range?

Click [Preview Stored Data] in Capture to replay data within a set range. Also, when clicking [Create a Capture] and naming the specified range, a capture is created in Stored Data.

### How can I display a graph on the timeline?

Set the data from the [Timeline Settings] menu.

### What is the capture?

A capture is obtained by executing [Create a Capture] to extract a specific time range in the data. Think of it as a bookmark with a specified time range.

### Is there a limit on the playable time?

The playable time differs depending on the environment. For more information, contact your aptpod representative.

### How can I download time-series data?

You can download data from the [Data Download] menu.

## 17.6 Q&A about various settings

---

### How can I delete a panel that has been set?

Select the panel you want to delete, and then select [Delete Panel].

### Is it possible to change the size of a panel?

Hover the mouse over the Panel and drag one of the nine handles on the frame to resize it.

### Is it possible to display visual parts in full screen?

You can enlarge visual parts and cancel them by clicking the button at the bottom of the panel. In addition, you can display specific parts such as videos and maps on the entire background of the window by clicking the full screen button.

### Is it possible to switch the display to full screen?

Click the full-screen display icon in the upper left of the window. To return the display to the original size, click the full-screen display icon again.

### Is it possible to copy the visual part panel being displayed?

Drag and drop the panel you want to copy while holding down the [Alt] key.

## 17.7 Other Q&A

---

**Is it possible to switch the display language?**

The display language of Data Visualizer is English only.

**Which environment is guaranteed to provide correct operation?**

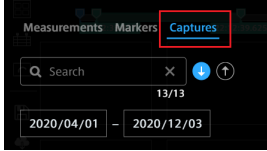

Operation on the Chrome browser is guaranteed for both Windows and Mac.

**What should I do if the version upgrade is not applied?**

Perform a super reload. Super reload ignores browser cache and forcibly downloads a file from the Web server.

## 18 Glossary

### 18.1 Terms related to Data Visualizer

| Term            | Description                                                                                                                                                                                                                                                                                        |
|-----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Data Binding    | To assign data to a panel. Data properly bound to visual parts will be displayed.                                                                                                                                                                                                                  |
| Capture         | Data that is extracted for a particular time range. Data can be extracted down to 0.001 seconds.<br>                                                                                                              |
| DAT             | A data file or format for storing data settings.                                                                                                                                                                                                                                                   |
| MasterTimestamp | A visual part that displays the reference time for playback. The current time is displayed for real-time measurement, and the measurement time of the playback target is displayed for Stored Data playback.<br> |
| Panel           | An area where visual parts are displayed. You can set visual parts individually, display frames for them, and change their display size.                                                                                                                                                           |
| Data Settings   | Definition for converting binary data into numeric values or character strings.                                                                                                                                                                                                                    |
| Rendering Speed | The number of times to render a part in one second.                                                                                                                                                                                                                                                |

### 18.2 General terms

| Term        | Description                                                                                                                               |
|-------------|-------------------------------------------------------------------------------------------------------------------------------------------|
| Binary Data | Data expressed in binary format.                                                                                                          |
| CAN         | The abbreviation for Controller Area Network, which is a serial bus for networks. This is the standard for in-vehicle networks.           |
| DBC         | This is the industry-standard conversion definition format (developed by Vector Inc.) for CAN bus definition files.                       |
| fps         | This term represents the number of frames per second.                                                                                     |
| HEX value   | Data expressed in hexadecimal format.                                                                                                     |
| Threshold   | Threshold of data. You can change the color of the panel when the value exceeds or falls below the specified value, or goes out of range. |

## 19 Support

If you have any questions or problems, please contact us by using the following contact information.

aptpod, Inc.

- Email address (customer support) [VM2M-support@aptpod.co.jp](mailto:VM2M-support@aptpod.co.jp)
- Website <https://www.aptpod.co.jp/en/>