

# Instruction Manual

Shock&Vibration data logger AccStick  
Model : A01-16400



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URL: <http://www.shinyei-tm.com>

### General warning

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- No part of this instruction manual can be transferred nor reproduced without permission.
- Alterations to the contents of this instruction manual are reserved without notice for future improvement.
- This instruction manual has been given the twice over to be doubly assured. However, we cannot be responsible for any mistakes which might have occurred within its contents. Please inform us if you have found obscurities, or wrong descriptions, skipped descriptions, or the like.












## Contents

<b>1. Precautions for operating the AccStick</b>	<b>– 1 –</b>
<b>2. About AccStick</b>	<b>– 2 –</b>
<b>3. Devices and Tools Required for Measurement and Analysis and Precautions during Handling and Operation</b>	<b>– 3 –</b>
3-1 Devices and tools required	– 3 –
3-1-1 Recorder	– 3 –
3-1-2 Software package	– 3 –
3-2 Precautions during operation and handling	– 3 –
3-2-1 Operation and handling of AccStick	– 3 –
3-2-2 Data capturing software	– 4 –
<b>4. Operation</b>	<b>– 5 –</b>
4-1 Battery	– 5 –
4-2 Body	– 6 –
4-3 Module for data connection / charging of battery	– 6 –
4-4 Data capacity	– 7 –
4-5 Data file	– 7 –
<b>5. Steps for installation of AccStick software</b>	<b>– 8 –</b>
<b>6. Measuring protocol</b>	<b>– 9 –</b>
6-1 Configuring measuring conditions	– 9 –
6-2 From Measuring to Download	– 10 –
<b>7. How to use the application software</b>	<b>– 11 –</b>
<b>8. Troubleshooting</b>	<b>– 15 –</b>
<b>9. AccStick Specifications</b>	<b>– 16 –</b>
9-1 Specification sheet	– 16 –
9-1-1 Hardware	– 16 –
9-1-2 Software	– 16 –
9-2 Dimensions	– 17 –
<b>10. Product Warranty</b>	<b>– 17 –</b>



## 1. Precautions for operating the AccStick

Precautions for operating the AccStick	
Please keep this notice	
Before using the AccStick, please read this notice and the AccStick's instruction manual thoroughly. We will not hold responsibility of any problems in relation to this notice.	
	<b>Danger</b> Problems resulting from the generation of heat, etc might occur if you use misuse the AccStick. Note contents as follows.
 Prohibit	Any sudden shocks, drops or hard strikes towards the Accstick unit may cause body damage or generation of heat with the lithium polymer battery that might catch fire. Be careful with this usage.
 Prohibit	Do not store and operate the AccStick in any place with heats over 60°C or extremely wet. These might be cause problems.
 Prohibit	Do not expose AccStick to wet conditions as damage or heating the internal battery might be occurred.
 Prohibit	Do not open the casing or modify the AccStick. These might be cause damage or other problems.
 Prohibit	Prevent dust contamination at the connector part of the AccStick to prevent damage to the connector and lithium battery from overheating.
 Prohibit	Do not use the AccStick if you have found any errors to the instrument, or swelling of the battery.
 Action	Always use the cable paired with the AccStick when charge the battery. Other cables might cause any problems, overheating or damage to the battery.
 Action	When you dispose of the AccStick, please confirm on how to dispose it from a scrap company near you.

## 2. About AccStick

Shock & vibration data logger, AccStick, consist of the Accstick unit and the customized software. 2 types of 3axis accelerometer, microcontroller, operational switch, and rechargeable battery, is packed into one unit with an outer aluminum casing. Continuous measurements up to 3 days are made possible.

Operation is as follows.

Configure the measuring conditions of unit via the specified software.

Install this unit to the object of which acceleration is to be measured.

After measuring, acceleration waveforms can be downloaded to your PC through the specified software and converted to .csv file.

### 2-1 Features

#### 2-1-1 Instrument

- a) 3D MEMS accelerometer ( $\pm 16G$ 、 $\pm 200G$ )
- b) Small size, light weight
- c) Built in Timer
- d) Lithium polymer rechargeable battery (85mA/h)
- e) Variable measuring mode (Trigger mode, Trigger level, Frame length, etc)
- f) Viewing of output measured data via the specified software

#### 2-1-2 Specific Software

- a) Viewing data
- b) Configuring of the measuring condition
- c) Converting data (.csv file)

### 2-2 Application

- a) Response acceleration measuring of the specimen for the product evaluation test such as a shock test, a vibration test and a drop test
- b) Motion capturing of humans or Robots
- c) Vibration measuring of vehicles
- d) Shock measuring of the operational handling
- e) Other environmental measuring

### 3. Devices and Tools Required for Measurement and Analysis and Precautions during Handling and Operation

#### 3-1 Devices and tools required

##### 3-1-1 Recorder

- a) AccStick

##### 3-1-2 Software package

- a) Specific Software : the software can be downloaded on the website.

URL : [http://www.shinyei-tm.com/product\\_AccStick.html](http://www.shinyei-tm.com/product_AccStick.html)

- b) Personal computer※2

- CPU : Core 2 Duo processor 2GHz or equivalent.
- Main memory : 1024MB minimum
- Hard disc : available storage exceeding 3GB
- Display : Color display applicable to Windows
- USB communication port
- Serial communication port
- OS : Windows 7/10 (32bit/64bit)

#### 3-2 Precautions during operation and handling

##### 3-2-1 Operation and handling of AccStick

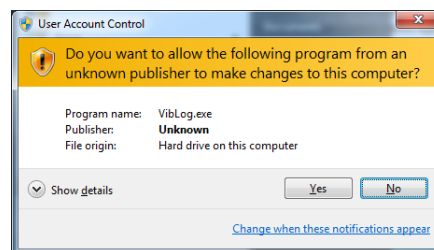
- a) This unit is manufactured rigidly for shock and vibration measurement. However, if excessive shock is applied to the unit by directly dropping it or the like, the unit may be damaged. The unit may be damaged if an impact exceeding  $10,000\text{m/s}^2$  is applied.
- b) Don't expose the unit to conditions where water vapors or sea breeze etc., is present directly to prevent any malfunctions with the AccStick.
- c) The working temperature of this instrument is between  $0^{\circ}\text{C} \sim +60^{\circ}\text{C}$ . Please refrain from using this unit in any wet conditions. In an environment where the instrument is exposed to the direct sunlight, the functions of the electronic circuits and a lithium battery might be severely affected.
- d) The electronic circuits and the lithium polymer battery are fixed on the case. Don't open the top plate or loosen any screws on the top plate, otherwise problems may occur and the accuracy cannot be guaranteed.
- e) Turn the power on before starting measurements. After measuring, the power should be kept on and connect to the PC. Only turn off the power supply after data download is completed.
- f) Do not attempt to prematurely terminate the measurements during the measuring process by turning the power off. An error will occur and no data will be available for download from the unit.
- g) Measurements should be made during the span of time in which the battery retains its charge. In the event of the battery voltage falling below the pre-set range during measurements, all data will be lost.
- h) Keep the battery power off when this unit is stored to prevent any problems with over discharging of the battery.
- i) Operate the unit according to the specified procedures. Any unorthodox operation, if any, may cause problems.
- j) Don't use the unit under the following environments.
  - A place where oils, chemicals, steam, iron powders, and dust exist in excess.

- A place where static electricity, magnetism, and noises frequencies are produced
- k) Be careful when an accelerated characteristic change or thick concentrations may cause damage when exposed to.
- Acetone, ammonia, ethanol, hydrogen dioxide, hydrogen sulfide, chlorine gas, sulfur oxides, nitrogen oxides, etc.

### 3-2-2 Data capturing software

Read following articles carefully before using the software. By using the software you are agreeing to the following articles.

- To use this software, Windows 7/10 is necessary as an OS. Install the OS onto the hard disc in advance.
- We are not responsible for any problems that arrises when you use this software on an OS other than windows 7/10.
- We do not guarantee the functionality on all PC's although we have verified the operation of the software on wide model range of PC's.
- During setup on Windows 7 / 10, the analytical software requires administrator approval. If the confirmation message appears as such, click yes and proceed to the next step.





## 4. Operation

### 4-1 Battery

AccStick has a rechargeable battery of lithium polymer that can be charged via a specific harness and micro USB cable connected to a PC. An Orange LED light appears when charging, and disappears when full charged (see Fig.1). The time it takes to full charge is around 60 min from empty. Also, this unit can operate continuously up to 3 days when the acceleration trigger is selected. This time range varies depending on the temperature, measuring condition etc.

Note1: After measuring, turn off the main power to prevent any issues with over charging of battery.

Note2: Measurements should be made during the span of time in which the battery retains its charge. In the event of the battery voltage falling below the pre-set range during measurements, all data will be lost.

Note3: Pin type of connector of harness is a difference between AccStick and relay module. Please note its direction when connect. (see Fig.2) Do not connect this harness with wrong direction since harness may be broken.

Note4: Rechargeable battery will be available until about 500 times charge.

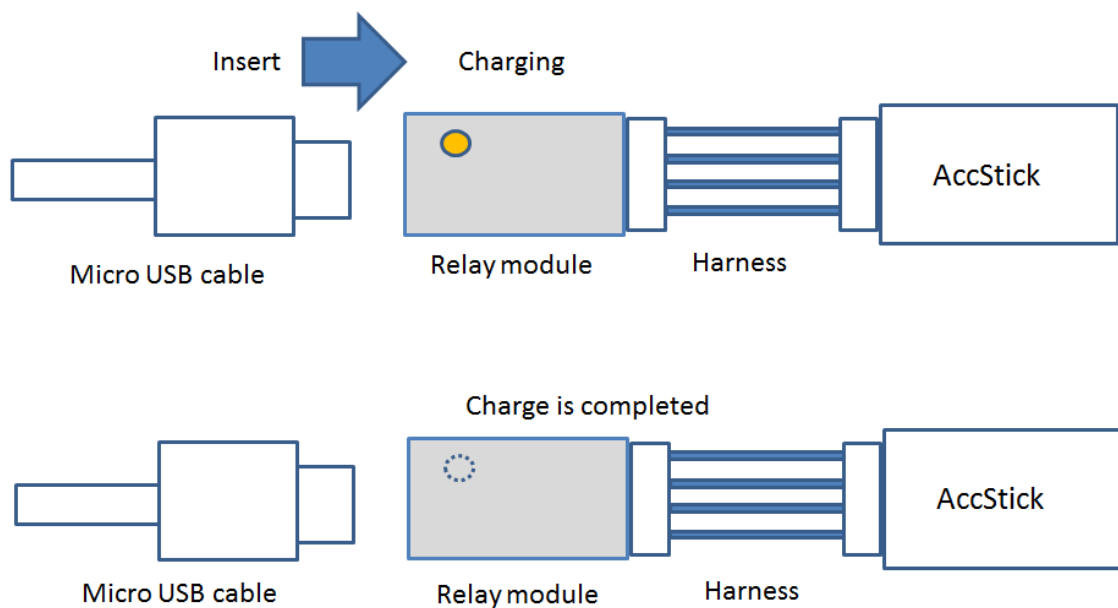


Fig.1 Condition of Battery Charging

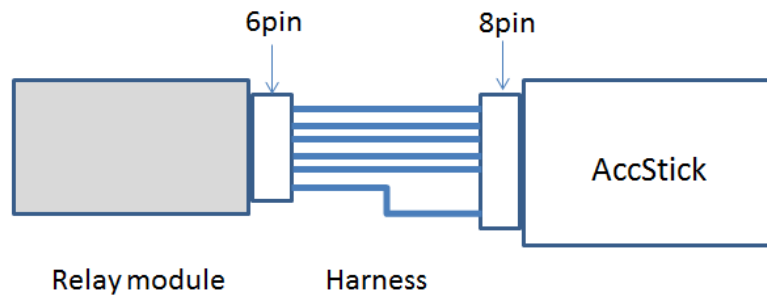
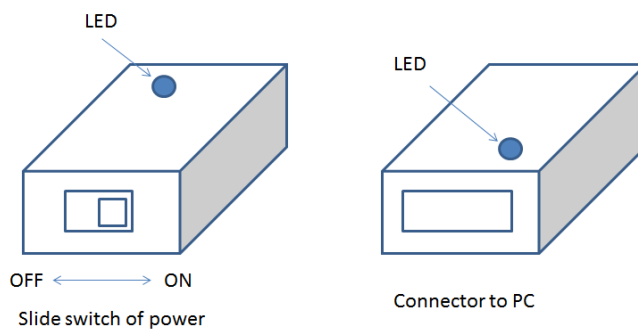


Fig.2 Direction of Harness connection

#### 4-2 Body

AccStick has a LED, main power switch and connector to connect to the PC.



##### a) Main power switch

Turn on the power when you start measuring. Do not attempt to prematurely terminate the measurements during the measuring process by turning the power off. An error will occur and no data will be available for download from the unit. After measuring, connect to the PC without turn off the power to prevent any issues. Turn off the power after data has been downloaded to your PC successfully. Also, retain the power turn off condition after measuring to prevent any issues with over discharge.

##### b) Connector for connection with PC

AccStick has a connector to connect to the PC to configure the measuring conditions or to charge the battery via the specified harness and micro USB cable.

##### c) LED

AccStick has a blue LED on its body that will flash when capturing data. Also flashing will be appeared during standby when the time trigger mode.

#### 4-3 Module for data connection / charging of battery

A special module for data connection and charging of battery is needed to connect with the PC.

#### <LED operation>

- Red/ blue LED flashes when connecting to PC
- Orange LED appears when the battery is charging

#### 4-4 Data capacity

AccStick has a 4MB flash memory can store acceleration data up to 500,000 points.

Measuring will be continuous until the selected frame length is achieved when trigger mode is configured as “immediately” or “Timer”.

When in “Acc.” or “Timer&Acc.” mode, the captured data can be up to a maximum of 500,000 data points with the selected frame length set as 1 frame. Refer to table below for the relationship between frame length and number of capture-able data.

Relationship between Frame and Data number	
Selected Frame	Capturable data number
500	1000
1000	500
10000	50
500000	1

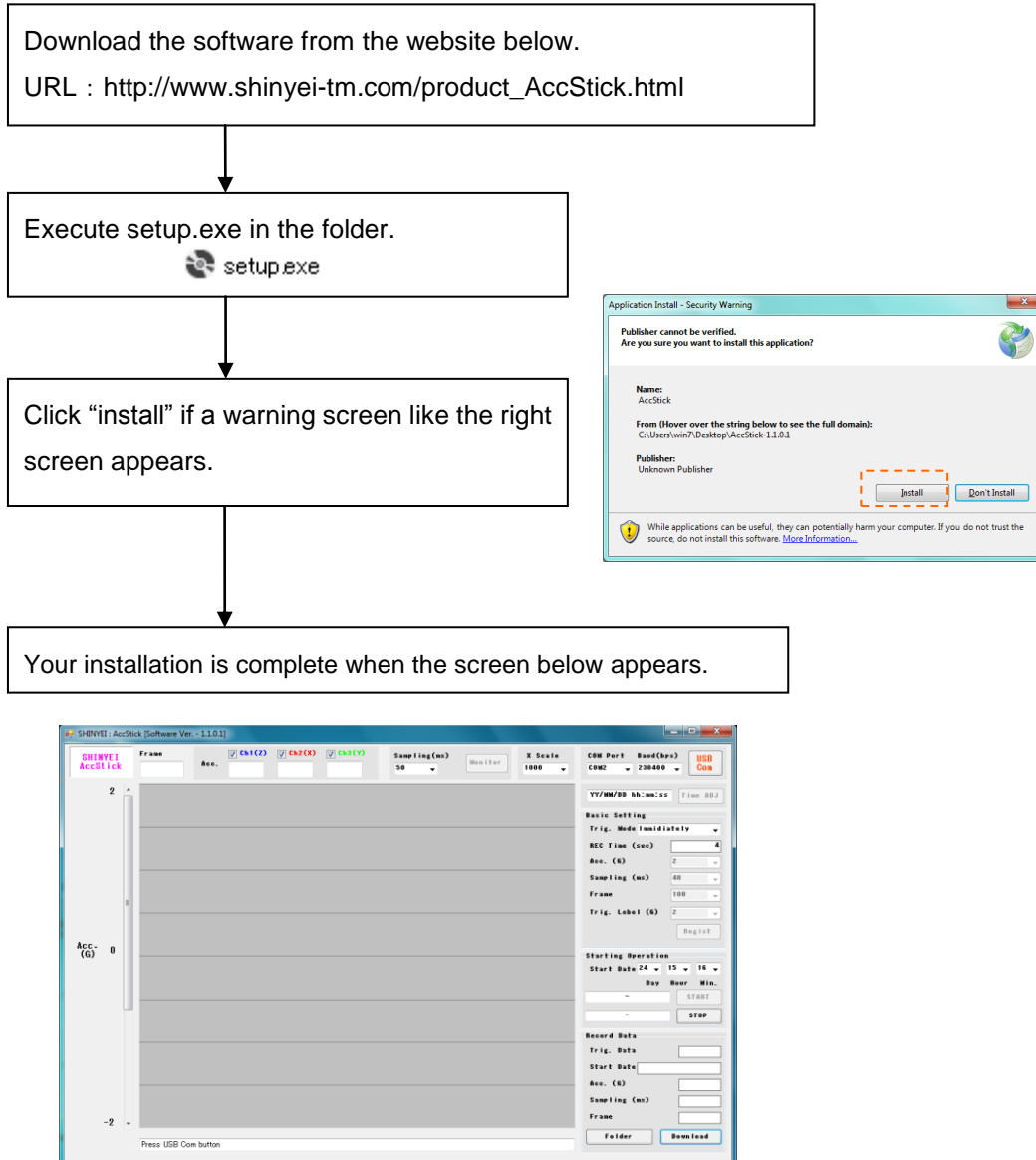
#### 4-5 Data file

Measured data is not just displayed on the PC software but also converted to .csv file after downloading to your PC.

The title of the .csv file will appear like ACCSTICK-YYMMDD\_hhmmss.

(YY means measurement year, MM means month, hh:mm:ss is the time information.)

## 5. Steps for installation of AccStick software



### <USB driver install>

Please install the USB driver into your PC if the unit cannot be connected with the PC. The USB driver is in “driver” folder in the downloaded folder.

## 6. Measuring protocol

### 6-1 Configuring measuring conditions

Connect AccStick to PC with the cable module like the picture on the right. Charge the battery if necessary.



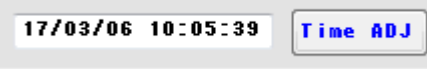
Click the “USB com” on the PC software after making sure the Baud (bps) is configured as 230400. After that, the icon color changes to blue if success.



※please confirm below if connection is not successfully.

- USB cable is disconnected and re-insert it to the PC.
- Confirm if the Baud(bps) is 230400.
- Check the connection between the USB cable, module harness and AccStick.

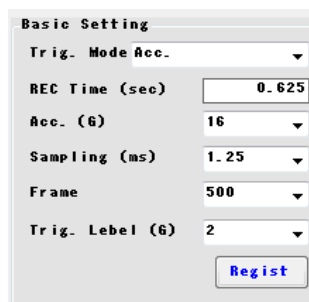
Click “Time ADJ” to align the time on your PC to the AccStick timer. The icon's color will change to blue if successful.



<Basic setting>

Click “Register” after selecting all the parameters. The icon color changes to blue if successful. Each parameter is shown on P.13.

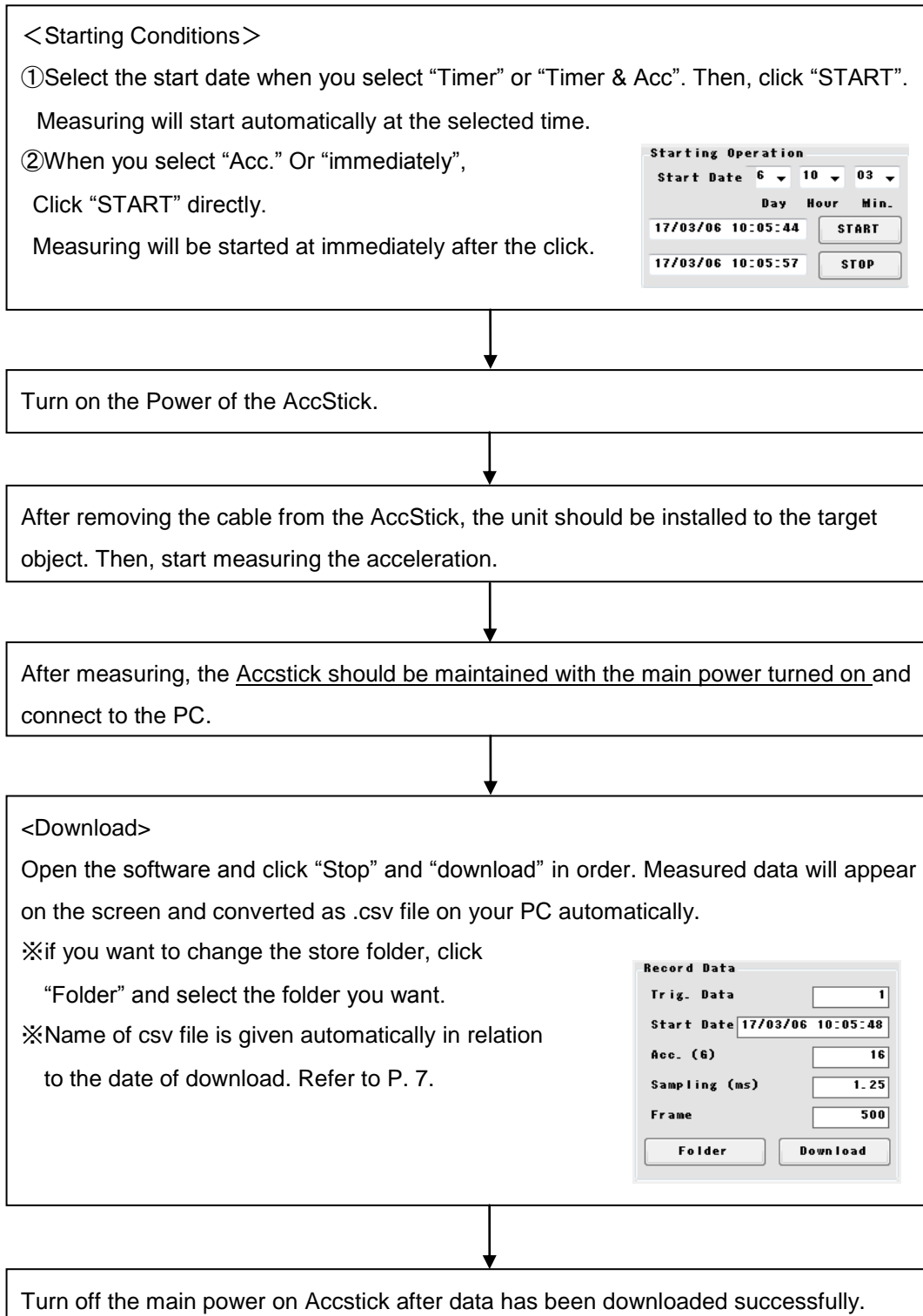
Complete setup of AccStick



※Note

Do NOT turn off the main battery when AccStick is communicating with the PC.

## 6-2 From Measuring to Download



### ※ Note ※

- ① Keep the main power turned on until data download has succeeded, even if measuring is completed.
- ② Turn off the power after data download to prevent any issues with over discharge when measuring is finished.

## 7. How to use the application software



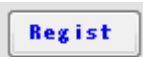





### 7-1 Screen

This software consists of a waveform screen and a configuration commands.



#### 7-1-1 Icon

There are 8 kinds of icon on the screen.

	USB communication	Communicate with the AccStick. Letters on the icon change to blue if successful.
	Time adjustment	To Align the AccStick time with your PC. Letters on the icon change to blue and also the uploaded time is shown on the screen if successful.
	Register	Upload to the AccStick the measuring conditions you've selected. Letter on the icon change to blue one if successful.
	START	Start to measure on the AccStick. Time at clicking is shown on the screen.
	STOP	Stop the measuring. Time at clicking is shown on the screen.
	Folder	Select the folder to download csv file.
	Download	Start to download from AccStick to your PC. Data will be appeared on the screen and created .csv file in the selected folder.
	Monitor	Start monitoring real time when AccStick connects with the PC successfully. In this function, viewing data cannot be stored in PC, just to monitor data.

### 7-1-2 Viewing captured data

Acceleration data captured by the AccStick can be viewed on the screen of the specific software.

Click “download” to enable measured data to show on the PC. The yellow bar such as below picture will be appear with each frame you select if you selected “Acc” or “Timer&Acc” trigger modes.

The vertical scale of the waveforms can be changed by sliding the bar on the left side. Also the horizontal scale can be changed by selecting the x axis.



Sample shot of waveform during “Acc.” trigger mode

### 7-1-3 Viewing data during monitoring function

Monitoring data real time can be displayed on the screen after click “Monitor” while connected between the AccStick and PC. To stop the monitoring, click “Monitor” again. The vertical scale of the waveform can be changed by sliding the bar on the left side. Also the scale horizontal waveform can be changed by selecting the x axis.

Note: Monitoring data will not be stored in the PC, it’s meant for viewing only.

#### <Configuring icon>

You can select the sampling rate of the monitoring function before starting.

<div>Sampling (ms)</div> <div>50</div>	Sampling	Select the sampling rate of the monitoring function. You cannot select this if monitoring is running.
<div>X Scale</div> <div>1000</div>	X axis scale	Change the horizontal scale here.
<div> <input checked="" type="checkbox"/> Ch1 (Z)           <input checked="" type="checkbox"/> Ch2 (X)           <input checked="" type="checkbox"/> Ch3 (Y)         </div> <div>Acc. [ ] [ ] [ ]</div>	Current data	You can see the current data on this screen bar.



#### 7-1-4 Measuring conditions

##### <Basic settings>

**Basic Setting**

Trig. Mode **Acc.** ▼

REC Time (sec) **0.625**

Acc. (G) **16** ▼

Sampling (ms) **1.25** ▼

Frame **500** ▼

Trig. Level (G) **2** ▼

**Regist**

Trig. Mode : Trigger mode that captures the shock & Vibration is selectable as below.

Immediately	Start to measure immediately after clicking “START”.
Timer	Start to measure when the selected time is approaching after clicking “START”.
Acc.	Start to measure when the acceleration is over the selected threshold level. This mode is suitable to use the vibration sensor, under 16G range.
Timer & Acc.	Combination mode of Timer and Acc.

REC Time (sec) : Measuring time of 1 frame obtained by Frame × Sampling is shown.

Acc. (G) : Measurable acceleration range is selectable from 2 to 400G as you require.

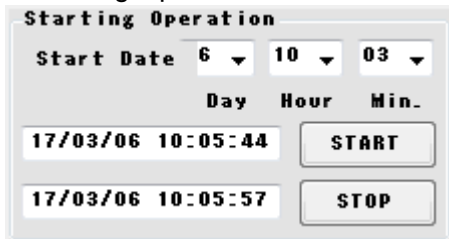
Sampling (ms) : Sampling for acceleration capturing is selectable. Unit is in mill-second(s).

Frame : Selected frame is the number of data captured.

- 1) Measuring is completed when data has reached the selected frame for Immediately and Timer trigger mode.
- 2) Measuring is continued until maximum memory capacity for every frame you’ve selected. In regards to the relationship between the frame and measurable data number, see P. 7.

Trig. Level (G): Threshold acceleration level that recording is started when “Acc.” or “Timer & Acc.” mode is adjusted.

#### <Starting Operation>



The 'Starting Operation' dialog box contains the following elements:

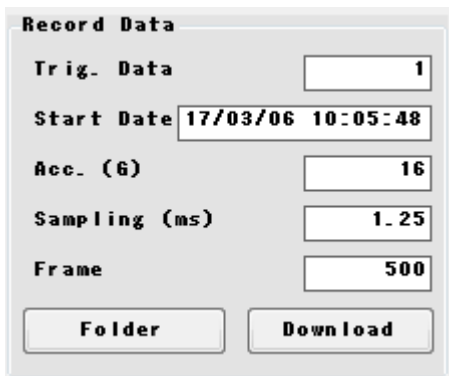
- Start Date:** Three dropdown menus for Day (6), Hour (10), and Min. (03).
- Day Hour Min.:** A label positioned below the date dropdowns.
- 17/03/06 10:05:44:** A text field showing the current start time.
- START:** A button to initiate the measurement.
- 17/03/06 10:05:57:** A text field showing the current stop time.
- STOP:** A button to stop the measurement.

**Start Date :** Configuration item for when Timer or Timer&Acc trigger mode is selected. Measuring will started at the time you selected. You do not need to configure this in Immediately or Acc. mode.

**START :** Measuring will begin after clicking, at the time as appeared on the PC. When “Timer” or “Timer&Acc.” modes are selected, the unit will start to measure at your selected time automatically after click “START”.

**STOP :** Measuring will be stopped after clicking, and the time on the PC will appeared.

#### <Record Data>



The 'Record Data' dialog box contains the following elements:

- Trig. Data:** A text field with the value 1.
- Start Date:** A text field with the value 17/03/06 10:05:48.
- Acc. (G):** A text field with the value 16.
- Sampling (ms):** A text field with the value 1.25.
- Frame:** A text field with the value 500.
- Folder:** A button to select a folder for data download.
- Download:** A button to start data download from AccStick.

**Trig. Data :** Measured acceleration data is shown.

- At Immediately or Timer mode, trig data is shown as 1.
- At Acc. or Timer&Acc. mode, trig. data shows the number of measured data of each frame you selected.

**Start Date :** Date & time of download shows here.

**Acc. (G) :** Selected acceleration range is shown.

**Sampling(ms) :** Selected sampling rate is shown.

**Frame :** Selected frame is shown.

**Folder :** Stored folder for data download is selected as you require.

**Download :** Start data download from AccStick. Data will be appeared on the screen and converted csv file in the selected folder.

## 8. Troubleshooting

Trouble	Reason	Response
AccStick can't be accessed with PC.	Baud (bps) is configured at a different value.	Baud(bps) should be configured at 230400.
	USB cable or the specified harness is not connected successfully with the AccStick.	<ul style="list-style-type: none"> <li>• Confirm the cable connection</li> <li>• Remove the cable, and insert to PC again</li> </ul>
	Specified USB driver is needed for your PC.	Install the USB driver to your PC. (refer to P. 8)
	Electrical board or the specified harness of AccStick is broken.	Contact to the sales agent.
	Over discharge of battery.	Contact to the sales agent.
AccStick doesn't have any data after measuring.	Forgot to click "START" on the PC software.	Restart after clicking "START". (refer to P. 10)
	Main power of AccStick was turned off during the measuring.	Main power should be turned on at the switch on AccStick before starting. (refer to P. 10)
	After measuring, the main power was turned off before connecting with PC.	Connect the PC to the AccStick and keep the power on, and do the data download. (refer to P. 8)
	Low battery level.	Charge the battery. (see P. 5)
	Software or the body is damaged.	Contact to the sales agent.
	Over discharge of battery.	Contact to the sales agent.
Other	「fail to communicate to AccStick」 on the screen, then AccStick cannot be connected.	<ul style="list-style-type: none"> <li>• Confirm to connect to AccStick with USB cable correctly</li> <li>• Reopen the software</li> <li>• Reinsert USB cable to AccStick</li> </ul>
	「Select COM port」 on the screen, then AccStick cannot be connected.	Select suitable comport on your PC.
	「fail to receive response」 on the screen, then AccStick cannot be connected.	Contact to the sales agent.

## 9. AccStick Specifications

### 9-1 Specification sheet

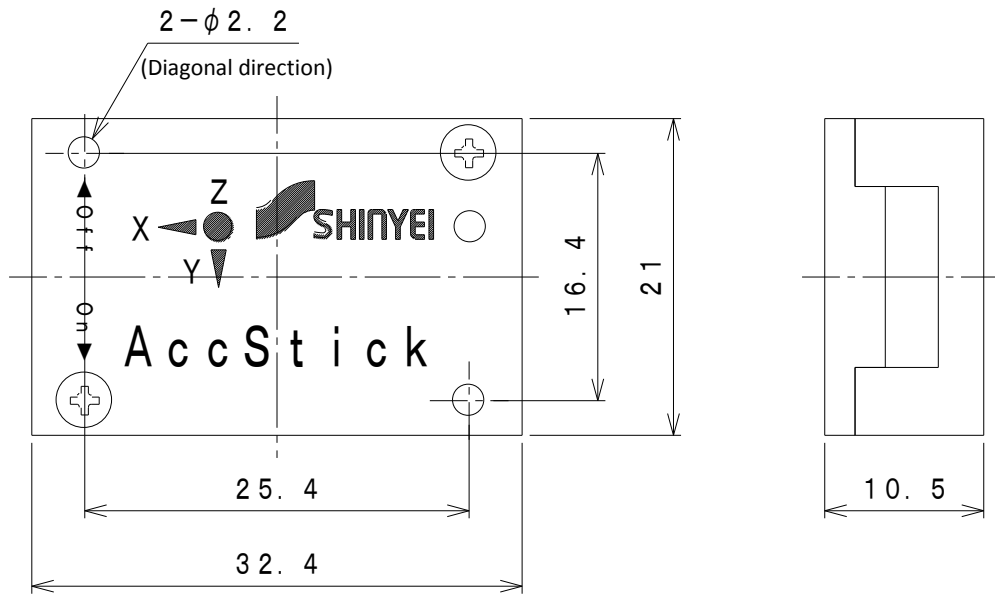
#### 9-1-1 Hardware

Model	A01-16400
Accelerometer	3axis MEMS type $\pm 16G$ (Vibration sensor) 3axis MEMS type $\pm 400G$ (Shock sensor)
Memory capacity	Flash memory 4MB (Up to 500000 data recording)
Power supply	Lithium polymer rechargeable battery (85mA/h)
Continuous measuring	Around 3 days ※When full battery, Acc. trigger mode, sampling 1.25ms at 20°C. ※Depends on temperature and measuring conditions.
Operational temperature range	0 to 60 °C
Size / mass	32.4×21.0×10.5 mm / 15.0g
Casing	Aluminium

#### 9-1-2 Software

Trigger mode	4 modes (Immediately/ Timer/ Acc./ Timer&Acc.)
Acceleration range (G)	2, 4, 6, 8, 16 (Use a vibration sensor) 100, 200, 400 (Use a shock sensor)
Sampling rate (ms)	0.625, 1.25, 2.5, 10, 20, 40, 80, 160 (0.625ms is selectable when Acceleration range is set for 16G or below.)
Frame (Data number of single shot)	100 to 500000
Number of measurable data	Ex. 500 data (1000 frame setting and Acc. mode)
PC software	Windows 7/10 (32 or 64bit)

## 9-2 Dimensions



## 10. Product Warranty

3D acceleration data logger AccStick is guaranteed as specified below.

- ① For problems under normal working conditions, we will repair the unit without any charge for one year from the date of delivery.
- ② This instrument delivered has gone through severe inspections. If any problems should occur, please contact your sales agent or our company.
- ③ We will repair the unit at counter value in the following cases even if it's within the warranty period.
  - a) Problems due to usage other than normal working purposes
  - b) Problems caused by misuse or unauthorized repair or modifications
  - c) Problems caused by a fire or natural disasters

Any secondary loss, including damage to facility, opportunity loss and loss of profit, even which is caused by the malfunction of the AccStick is out of our warranty coverage.