

**For Super-mini Signal Conditioners with Display M1E-4 Series**

**M1E CONFIGURATOR SOFTWARE**

**Model: M1E4CFG**

**USERS MANUAL**

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# 1. INTRODUCTION

## 1-1. GENERAL DESCRIPTION

M-System M1E4CFG is used to program parameters for Super-mini Signal Conditioners with Display M1E-4 series (herein-after referred to as 'device').

The following major functions are available:

- 1) Download parameters to a device and upload the parameters from the device
- 2) Edit parameters offline (not connected to the device)
- 3) Save parameters as a file and read the parameters from the file
- 4) Compare parameters (to be) edited on the screen with the currently set parameters of the device
- 5) Adjust parameters online (connected to the device) in real time

## 1-2. APPLICABLE DEVICES

M1E4CFG is applicable to the following products in the firmware versions as respectively indicated below or higher:

TYPE	MODEL	SYMBOL	FIRMWARE VERSION
Signal Transmitter	M1EXV-4	–	1.01.0023

Confirm that the product you have purchased is compatible with M1E4CFG.

The latest versions of the M1E4CFG and users manual are downloadable at M-System's web site ([www.m-system.co.jp](http://www.m-system.co.jp)).

In this manual, descriptions given with the above symbols are applied only to the respective models to which those symbols are assigned.

Other descriptions with no specific symbol are applied to all models.

## 1-3. PC REQUIREMENTS

The following PC performance is required for adequate operation of the M1E4CFG.

PC	IBM PC compatible
OS	Windows 7 (32bit / 64bit) (English/Japanese) Windows 8.1 (32bit / 64bit) (English/Japanese) Windows 10 (32bit / 64bit) (English/Japanese) The software may not operate adequately in certain conditions.
CPU	Must meet the relevant Windows' requirements.
Memory	
Communication Port	COM port (RS-232-C) or USB port

One of the dedicated cables as listed below is required to connect the device to PC.

Port	PC Configurator Cable Model No.
RS-232-C	MCN-CON
USB	COP-US

Set your windows DPI to 'Smaller - 100%' for optimum display.

Some screens may not be displayed properly if set to other than 'Smaller - 100%'.

## 1-4. INSTALLING & UNINSTALLING THE PROGRAM

### INSTALL

The program is provided as compressed archive.

Decompress the archive and execute "setup.exe" to start up the M1E4CFG installer program.

Follow instructions on the Windows.

### UNINSTALL

- For Windows 7 and 8.1, open Control Panel > Uninstall a program, or Uninstall or change a program. Select the M1E4CFG from the program list and click [Uninstall] button.
- For Windows 10, open Settings from Start menu > System > Apps & features. Select the M1E4CFG from the program list and click [Uninstall] button.

## 2. GETTING STARTED

### 2-1. STARTING THE M1E4CFG

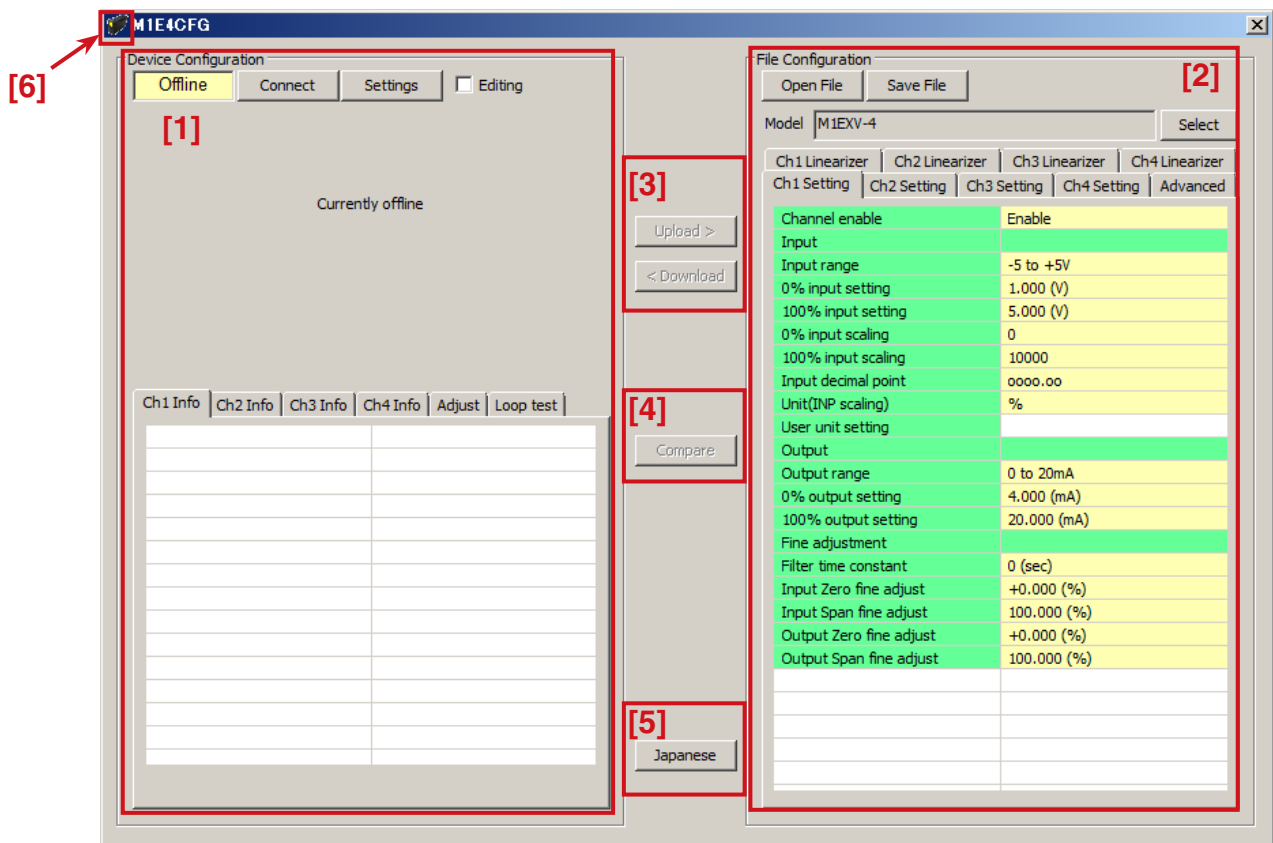
- Windows 7 : Open Program > M-SYSTEM > Configurator > M1E4CFG
- Windows 8.1: Open All Apps on the Start screen > M-SYSTEM > M1E4CFG
- Windows 10 : Open All Apps on the Start menu > M-SYSTEM > M1E4CFG  
to start up the M1E4CFG on the Windows PC.


### 2-2. TERMINATION

To terminate the program, click the [X] button on the right-top of the window.

### 2-3. SCREEN COMPONENTS

The table below shows details of each screen component on the M1E4XFG window.



[1] Device Configuration	Communication port is set, and M1E4CFG is connected or disconnected with the device. Parameters of the device being connected can be adjusted in real time. Channel settings are displayed in real time.
[2] File Configuration	All parameters are shown and edited regardless of whether the device is connected or disconnected. The edited parameters can be saved in a file and the saved parameters can be read from the file.
[3] Upload / Download	[Upload>] button is to read parameters of a device and show them in the [File Configuration] frame. [<Download] button is to write edited parameters into a device.
[4] Compare	[Compare] button to compare parameters of the connected device with those shown in the [File Configuration] frame. The parameters of the item showing a difference are highlighted in red.
[5] English / Japanese	The button to switch the display language between English and Japanese. The program starts up in English mode as initial state when the OS is other than Japanese version. It can be switched to Japanese only when the OS supports Japanese language.
[6] Version	Click (or right-click)  on the left-top of the window to show the menu. Click [About M1E4CFG(A)...], and the version No. dialog box will appear.

## 2-4. CONNECTING TO THE DEVICE

When the PC starts communication with the device, [Ch1 Info], [Ch2 Info], [Ch3 Info], [Ch4 Info], [Adjust] and [Loop test] are shown in the [Device Configuration] frame, where the parameters are edited or adjusted.

**NOTE 1:** Make sure that the “Lockout Setting” of the connected device is ‘Lock’ to change parameters on M1E4CFG.

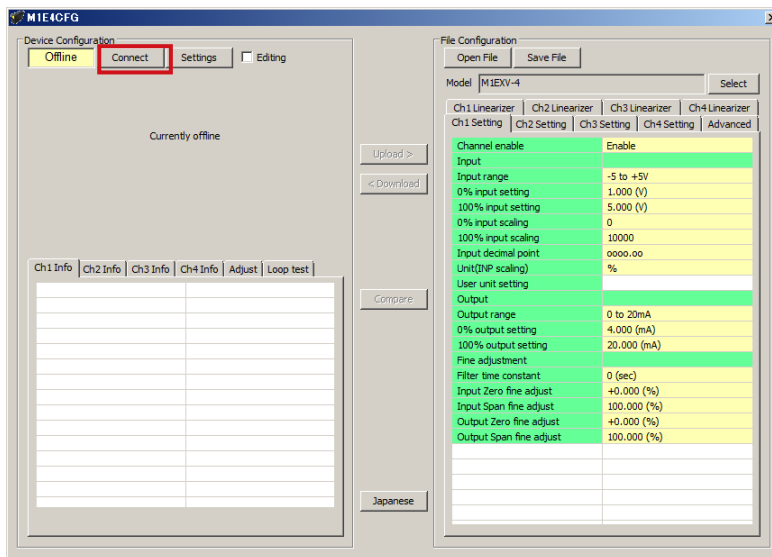
**NOTE 2:** The [File Configuration] shows initial values of the model indicated in the [Model] field, and they may be different from the setting parameters in the [Device Configuration] frame.

Click [Upload] to read setting parameters from the device connected to the M1E4CFG and show them in the [File Configuration] frame.

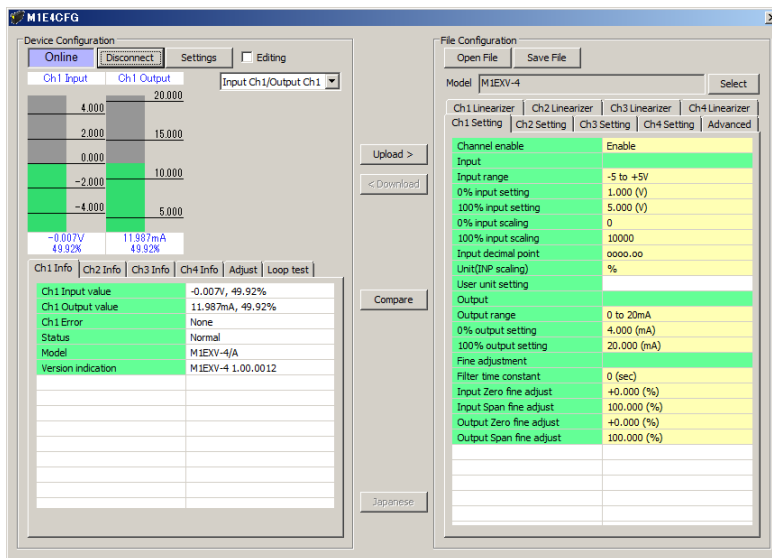
Click [Settings] to choose the COM port number used to communicate with the device.

Once a COM port is specified after the M1E4CFG has been installed and started, there is no need to repeat the setting procedure until the next time the COM port needs to be changed.

Click [Connect] button to start communication with the device to be connected.



The model of the device is automatically recognized and the device data is uploaded and shown in the [Device Configuration] frame.



The bargraph shows real time I/O status of the device, and the I/O channel to display on the bargraph can be selected from the pull-down menu.

Access the menu tab such as [Ch1 Info], [Ch2 Info], [Ch3 Info], [Ch4 Info], [Adjust] or [Loop test] to perform necessary operation.

The scales of the bargraph are determined automatically by [0% input setting] and [100% input setting], or [0% output setting] and [100% output setting].

When the configurator cable is disconnected, the display on the [Ch1 Info], [Ch2 Info], [Ch3 Info], or [Ch4 Info] tab disappears and the M1E4CFG becomes ready to connect with another device.

In order to proceed to another device, simply connect a new device by inserting a cable so that the M1E4CFG automatically starts to communicate with the new device without clicking the [Connect] button.

Click [Disconnect] to terminate the communication with the device.

### 3. CH INFO - CHANNEL INFORMATION

When the PC starts to communicate with the device, channel information such as current I/O values, device status, model number, etc. are shown on each of the [Ch1 Info], [Ch2 Info], [Ch3 Info], and [Ch4 Info] tab.

Ch1 Info	Ch2 Info	Ch3 Info	Ch4 Info	Adjust	Loop test
Ch1 Input value	-0.007V, 49.92%				
Ch1 Output value	11.987mA, 49.92%				
Ch1 Error	None				
Status	Normal				
Model	M1EXV-4/A				
Version indication	M1EXV-4 1.00.0012				

Item	Explanations																		
Input value	Current input value of the corresponding channel is indicated in engineering unit and in percentage.																		
Output value	Current output value of the corresponding channel is indicated in engineering unit and in percentage.																		
Status	Current device status as shown below is indicated. (When two or more statuses occur at the same time, the highest priority status is indicated.)																		
	<table border="1"> <thead> <tr> <th>Display</th> <th>Priority</th> <th>Status</th> </tr> </thead> <tbody> <tr> <td>Fixed I/O</td> <td>1</td> <td>I/O is fixed with the M1E4CFG operation. (The fixed I/O state set with the front buttons of the device is not reflected.) (Device display: None)</td> </tr> <tr> <td>Unlock</td> <td>2</td> <td>Settings are being changed with the front buttons of the connected device. (When the device is in this state, settings cannot be changed on M1E4CFG. The checkmark on the [Editing] box will be automatically disabled.) (Device display: Unlock)</td> </tr> <tr> <td>Normal</td> <td>3</td> <td>The device is operating normally. (Device display: Lock)</td> </tr> </tbody> </table>	Display	Priority	Status	Fixed I/O	1	I/O is fixed with the M1E4CFG operation. (The fixed I/O state set with the front buttons of the device is not reflected.) (Device display: None)	Unlock	2	Settings are being changed with the front buttons of the connected device. (When the device is in this state, settings cannot be changed on M1E4CFG. The checkmark on the [Editing] box will be automatically disabled.) (Device display: Unlock)	Normal	3	The device is operating normally. (Device display: Lock)						
	Display	Priority	Status																
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Normal	3	The device is operating normally. (Device display: Lock)																	
Error	Current error of the corresponding channel as shown below is indicated. (When multiple errors occur at the same time, the highest priority error is indicated.)																		
	<table border="1"> <thead> <tr> <th>Error Message</th> <th>Priority</th> <th>Status</th> </tr> </thead> <tbody> <tr> <td>OVER RANGE D</td> <td>1</td> <td>Input value is less than -5%.</td> </tr> <tr> <td>OVER RANGE U</td> <td>1</td> <td>Input value exceeds 105%.</td> </tr> <tr> <td>SCALING ERROR D</td> <td>2</td> <td>Calculated result of input scaling value is less than -99999.</td> </tr> <tr> <td>SCALING ERROR U</td> <td>2</td> <td>Calculated result of input scaling value exceeds 999999.</td> </tr> <tr> <td>None</td> <td>3</td> <td>No error</td> </tr> </tbody> </table>	Error Message	Priority	Status	OVER RANGE D	1	Input value is less than -5%.	OVER RANGE U	1	Input value exceeds 105%.	SCALING ERROR D	2	Calculated result of input scaling value is less than -99999.	SCALING ERROR U	2	Calculated result of input scaling value exceeds 999999.	None	3	No error
	Error Message	Priority	Status																
	OVER RANGE D	1	Input value is less than -5%.																
	OVER RANGE U	1	Input value exceeds 105%.																
	SCALING ERROR D	2	Calculated result of input scaling value is less than -99999.																
SCALING ERROR U	2	Calculated result of input scaling value exceeds 999999.																	
None	3	No error																	
Model	Model number of the device Note: Ex-factory model number is indicated. The model number will be the same even if I/O settings are changed at site.																		
Version	Firmware version number of the device																		

## 4. SETTING PARAMETERS

All setting parameters can be edited in the [File Configuration] frame.

### 4-1. PARAMETER SETTING IN [FILE CONFIGURATION]

Read parameters from a device (upload), edit them, and then write them to the device (download).

Setting parameters can also be saved in a file, and the file can be read, edited, and written to.

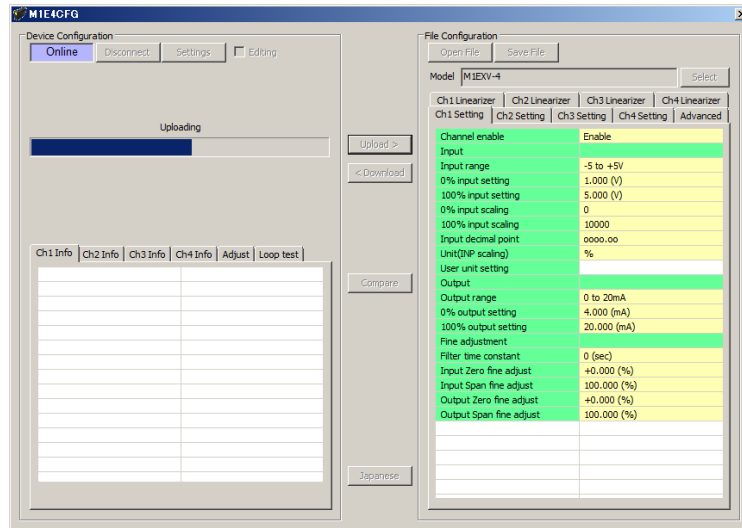
Thus, parameters to be edited can also be read from a saved file.

To save and read a file, refer to “7. READING / SAVING FILES” on page 14.

#### 4-1-1. UPLOAD

Click [Upload>] while the PC communicates with the device.

The M1E4CFG starts reading parameters from the connected device, and a progress bar appears to show the progress of the upload.



When the upload is complete, the parameters are shown within the [File Configuration] frame and become editable.

**NOTE 1:** DO NOT turn off the power supply to the device or disconnect the configurator cable while uploading.

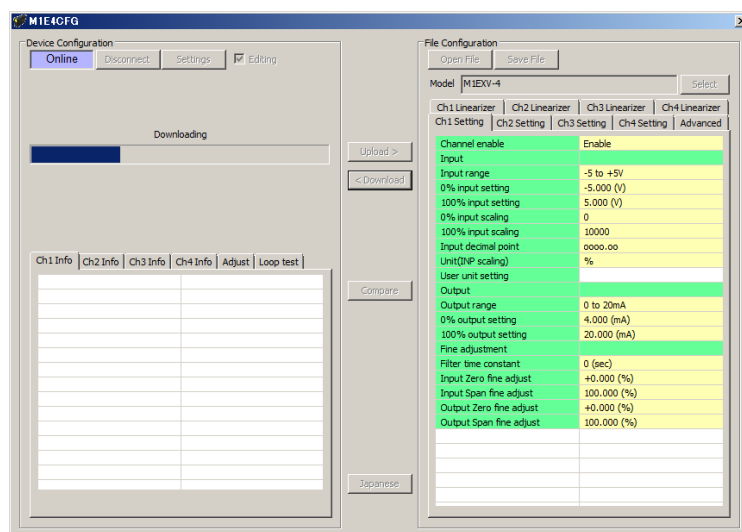
**NOTE 2:** DO NOT edit the setting parameters in the [File Configuration] frame while uploading.

#### 4-1-2. DOWNLOAD

When you finish editing the parameters, click [<Download] while the PC communicates with the device.

The M1E4CFG starts writing the parameters having been edited to the connected device.

A progress bar appears to show the progress of the download.



When the download is complete, the setting parameters edited in the [File Configuration] frame are written into the device.

**NOTE 1:** DO NOT turn off the power supply to the device or disconnect the configurator cable while downloading.

**NOTE 2:** DO NOT edit the setting parameters in the [File Configuration] frame while downloading.



### 4-1-3. EDITTING SETTING PARAMETERS

Click a value field, and a pull-down menu or an edit box will be displayed.

Select or enter a value in accordance with your desired setting.

Pull-down menu: For example, click the [Input range] field to show a pull-down menu.

Select a desired input range (See figure below).

Ch1 Linearizer		Ch2 Linearizer		Ch3 Linearizer		Ch4 Linearizer			
Ch1 Setting		Ch2 Setting		Ch3 Setting		Ch4 Setting		Advanced	
Channel enable	Enable								
Input									
Input range	-5 to +5V								
0% input setting	-5.000 (V)								
100% input setting	5.000 (V)								
0% input scaling	0								
100% input scaling	10000								
Input decimal point	0000.00								
Unit(INP scaling)	%								
User unit setting									
Output									

Edit box: For example, click the [0% input scaling] field to show the edit box.

Enter a desired value and press Enter key (See figure below).

Ch1 Linearizer		Ch2 Linearizer		Ch3 Linearizer		Ch4 Linearizer			
Ch1 Setting		Ch2 Setting		Ch3 Setting		Ch4 Setting		Advanced	
Channel enable	Enable								
Input									
Input range	-5 to +5V								
0% input setting	-5.000 (V)								
100% input setting	5.000 (V)								
0% input scaling	<input type="text" value="0"/>								
100% input scaling	10000								
Input decimal point	0000.00								
Unit(INP scaling)	%								
User unit setting									
Output									

When parameters have been edited, write them to the device in order to reflect them immediately in the same procedure as that described in “4-1-2. DOWNLOAD” on page 8.

To save them in a file, refer to “7-2. SAVING PARAMETERS IN A FILE” on page 14.

For specific setting parameter items and ranges for respective models, please refer to “8. PARAMETER DETAILS” on page 15.

## 4-2.COMPARING SETTING VALUES IN THE DEVICE

Setting parameters currently shown (values in the File Configuration column) can be compared with those stored in the connected device (values in the Device Configuration column).

Thus, parameters stored in the connected device can be compared with parameters of another device by uploading from the other device, or with those of its own or another device by reading from a file.

Click [Compare] button to start reading setting parameters from the connected device and show the result of comparison as shown below.

Setting Mode	Setting Parameter	Device Configuration	File Configuration
Ch1 Setting	0% input setting	-5.000 (V)	1.000 (V)
Ch1 Setting	100% input setting	5.000 (V)	5.000 (V)
Ch1 Setting	0% input scaling	0	0
Ch1 Setting	100% input scaling	10000	100000
Ch1 Setting	Input decimal point	0000.00	000.000
Ch1 Setting	Unit(INP scaling)	%	%
Ch1 Setting	User unit setting		
Ch1 Setting	Output range	0 to 20mA	-5 to +5V
Ch1 Setting	0% output setting	4.000 (mA)	-5.000 (V)
Ch1 Setting	100% output setting	20.000 (mA)	5.000 (V)
Ch1 Setting	Filter time constant	0 (sec)	10 (sec)
Ch1 Setting	Input Zero fine adjust	+0.000 (%)	+0.000 (%)
Ch1 Setting	Input Span fine adjust	100.000 (%)	100.000 (%)
Ch1 Setting	Output Zero fine adjust	+0.000 (%)	+0.000 (%)
Ch1 Setting	Output Span fine adjust	100.000 (%)	100.000 (%)
Ch2 Setting	Channel enable	Enable	Enable
Ch2 Setting	Input range	-5 to +5V	-5 to +5V
Ch2 Setting	0% input setting	1.000 (V)	1.000 (V)
Ch2 Setting	100% input setting	5.000 (V)	5.000 (V)
Ch2 Setting	0% input scaling	0	0
Ch2 Setting	100% input scaling	10000	10000
Ch2 Setting	Input decimal point	0000.00	0000.00
Ch2 Setting	Unit(INP scaling)	%	%
Ch2 Setting	User unit setting		

8 setting parameter(s) not matching.

The parameters are compared, respectively, and listed on the screen side by side in order of items for [Ch1 Setting], [Ch2 Setting], [Ch3 Setting], [Ch4 Setting], [Advanced], [Ch1 Linearizer], [Ch2 Linearizer], [Ch3 Linearizer], and [Ch4 Linearizer] tabs.

The rows of values showing differences between [Device Configuration] and [File Configuration] are highlighted in red. The total number of parameters whose values do not match is indicated at the bottom.

**NOTE 1:** DO NOT turn off the power supply to the device or disconnect the configurator cable while comparing.

**NOTE 2:** DO NOT edit the setting parameters in the [File Configuration] frame while comparing.

## 4-3.CONFIGURATION EXAMPLES

General configurations that can be performed using the M1E4CFG are described with specific examples.

### 4-3-1. CONNECTING TO THE DEVICE

Start up the M1E4CFG.

Click [Settings] button and choose or confirm the COM port used to communicate with the device and click [Connect].

The PC starts to communicate with the device.

Click [Upload>] to read parameters from the device.

Check the [Editing] box in the [Device Configuration] frame to allow download of the setting in the [File configuration] frame.

**NOTE 1:** Make sure that the “Lockout Setting” of the connected device is ‘Lock’, or the [Editing] box cannot be checked.

**NOTE 2:** Make sure to disable Fixed I/O since the [Editing] box cannot be checked during a loop test (fixed I/O).

## 4-3-2. CONFIGURATION EXAMPLES OF CH1 SETTING / CH2 SETTING / CH3 SETTING / CH4 SETTING

Configuration examples in the [Ch1 Setting], [Ch2 Setting], [Ch3 Setting], and [Ch4 Setting] tabs of each model are described. When editing is complete, click [Download] to write the edited parameters in the device.

### 4-3-2-1. M1EXV-4

The procedure to configure the I/O of the M1EXV-4 unit in accordance with the following specifications is described:

Input : Ch1 = 0 to 10 V DC, Ch2 = 1 to 5 V DC, Ch3 = 0 to 5 V DC, Ch4 = 4 to 20 mA DC

Output : Ch1 = 4 to 20 mA DC, Ch2 = 2 to 10 mA DC, Ch3 = 0 to 10 V DC, Ch4 = 1 to 5 V DC

#### 1) Input

Set [Input range] according to the specification of input signal.

- [Input range]

\_\_\_\_\_

-10 – +10 V

\_\_\_\_\_

-5 – +5 V

\_\_\_\_\_

0 – 20 mA

Select the input range “-10 – +10 V” in the [Ch1 Setting], “-5 – +5 V” in the [Ch2 Setting], “-5 – +5 V” in the [Ch3 Setting], and “0 – 20 mA” in the [Ch4 Setting].

When [Input range] is selected, [0% input setting] and [100% input setting] are automatically set to the initial values of the selected [Input range]. Set them to your desired values.

Set [0% input setting] and [100% input setting] within the selected [Input range] as follows.

[Ch1 Setting]: [0% input setting] to 0.000; [100% input setting] to 100.000

[Ch2 Setting]: [0% input setting] to 1.000; [100% input setting] to 5.000

[Ch3 Setting]: [0% input setting] to 0.000; [100% input setting] to 5.000

[Ch4 Setting]: [0% input setting] to 4.000; [100% input setting] to 20.000

#### 2) Output

Set [Output range] according to the specification of output signal.

- [Output range]

\_\_\_\_\_

-10 – +10 V

\_\_\_\_\_

-5 – +5 V

\_\_\_\_\_

0 – 20 mA

Select the output range “0 – 20 mA” in the [Ch1 Setting], “0 – 20 mA” in the [Ch2 Setting], “-10 – +10 V” in the [Ch3 Setting], and “-5 – +5 V” in the [Ch4 Setting].

When [Output range] is selected, [0% output setting] and [100% output setting] are automatically set to the initial values of the selected [Output range]. Set them to your desired values.

Set [0% output setting] and [100% output setting] within the selected [Output range] as follows.

[Ch1 Setting]: [0% output setting] to 4.000; [100% output setting] to 20.000

[Ch2 Setting]: [0% output setting] to 2.000; [100% output setting] to 10.000

[Ch3 Setting]: [0% output setting] to 0.000; [100% output setting] to 10.000

[Ch4 Setting]: [0% output setting] to 1.000; [100% output setting] to 5.000

### 4-3-3. OTHER SETTINGS

For setting parameter items and ranges other than I/O setting for respective models, please refer to “8. PARAMETER DETAILS” on page 15.

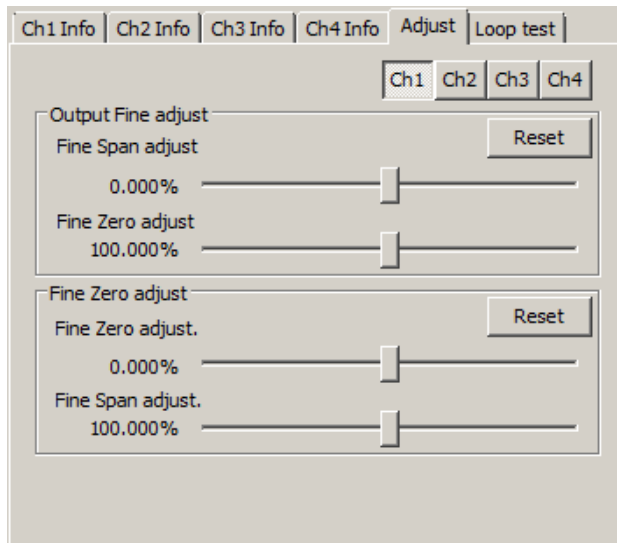
## 5. ADJUST - FINE ADJUSTMENTS

Fine zero and span adjustments can be performed for each of the input and the output. 'Fine Zero adjust' is an offset adjustment, while 'Fine Span adjust' is a gain adjustment.

Click [Ch1], [Ch2], [Ch3], or [Ch4] button to select a channel.

Drag each slider to the left or to the right to adjust.

Click either side of the slider or use arrow keys to adjust by minimum increments.



Perform 'Input Fine adjustment' while monitoring the input value indicated on the display of the device or the input value indicated on the upper part in the [Device Configuration] frame of the M1E4CFG.

Specifically, perform 'Fine Zero adjustment' by applying 0% input signal and adjusting the indicated value to 0%, and perform 'Fine Span adjustment' by applying 100 % input signal and adjusting the indicated value to 100%.

For 'Output Fine adjustment', perform 'Fine Zero adjustment' or 'Fine Span adjustment' while monitoring the output with a measuring instrument such as digital multi-meter.

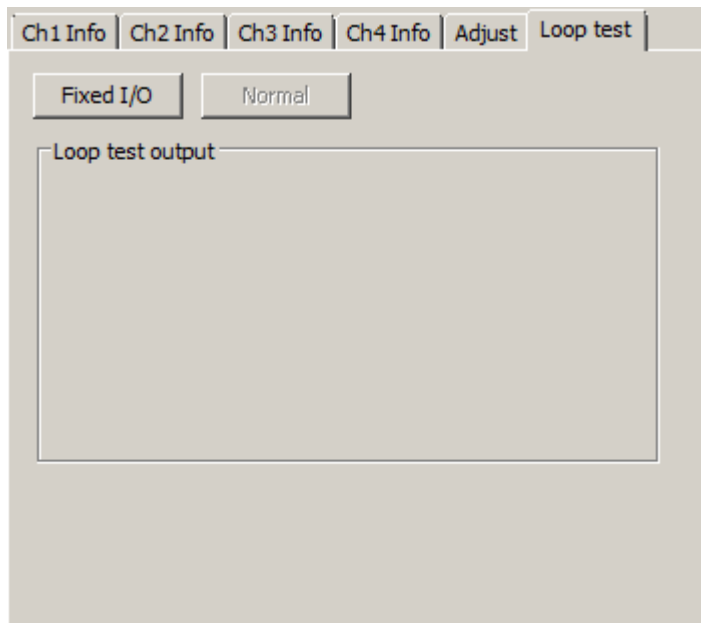
Specifically, perform 'Fine Zero adjustment' by applying 0% input signal and adjusting the output signal to 0%, and perform 'Fine Span adjustment' by applying 100 % input signal and adjusting the output signal to 100%.

To reset the Input and Output Fine adjustments to the factory default state, click each [Reset] button.

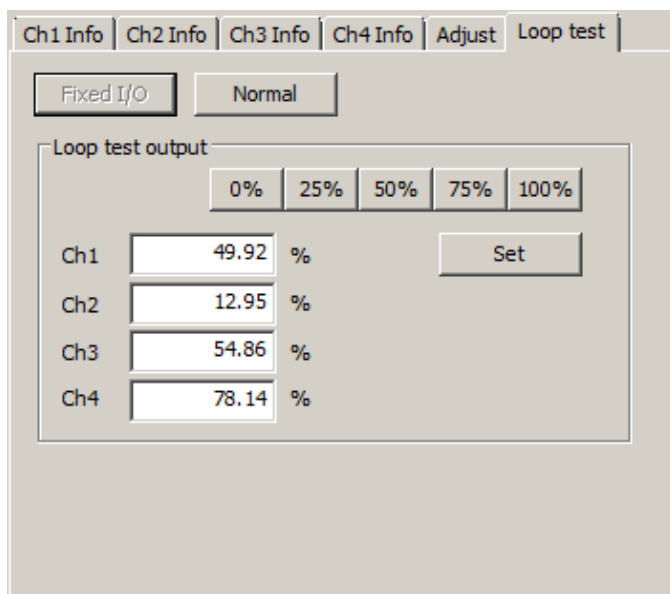
## 6. LOOP TEST

Loop test is performed with simulated output.

Note that Loop test can be performed only when the [Editing] box is unchecked.



- 1) Click [Fixed I/O] button to fix the output signal at the current value.  
The output signals become editable as shown below.  
In this state, the output does not change even if the input changes.



- 2) Enter a desired output value in the value field of each of [Ch1], [Ch2], [Ch3], and [Ch4].  
Or, simply click [0%], [25%], [50%], [75%], or [100%] to enter the specified value in all the value fields.  
Click Enter key or [Set] button to output signal of the specified percentage.

SYMBOL	SIMULATED OUTPUT RANGE
-	-5.00 to +105.00 %

- 3) Click [Normal] button to return to the normal mode in which the output follows the input.

**Note 1:** If the communication or the configurator cable is disconnected from the connected device during Fixed I/O, 'Loop test output' is stopped after a certain time.

**Note 2:** The [Editing] box cannot be checked during Fixed I/O.

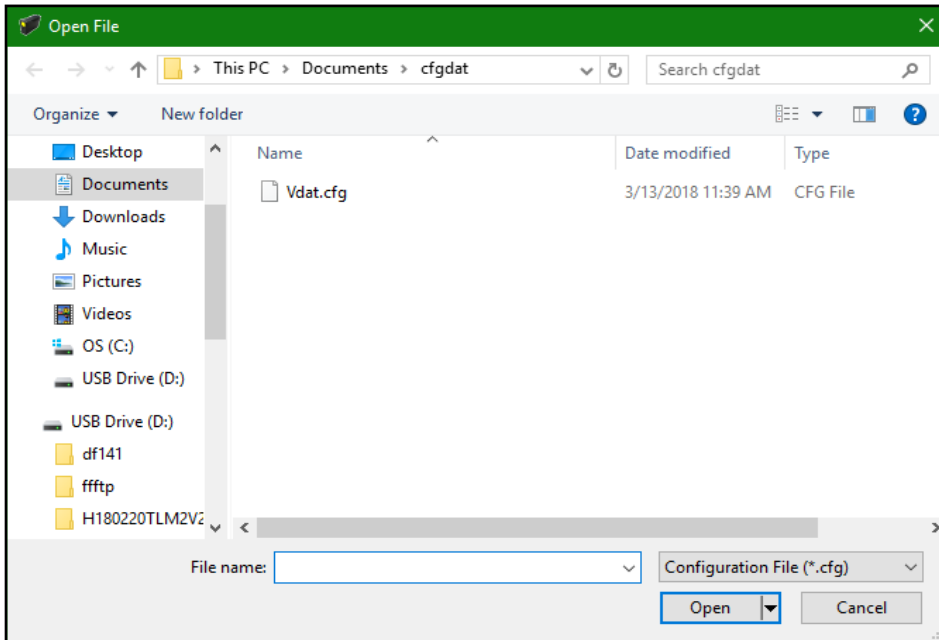
**Note 3:** DO NOT perform the front button operation of the device during the loop test.

## 7. READING / SAVING FILES

The setting parameters edited in the [File Configuration] can be saved as a file.  
By reading the parameters from the file, the same settings can be written to other devices easily.

### 7-1. READING SETTING PARAMETERS SAVED AS FILE

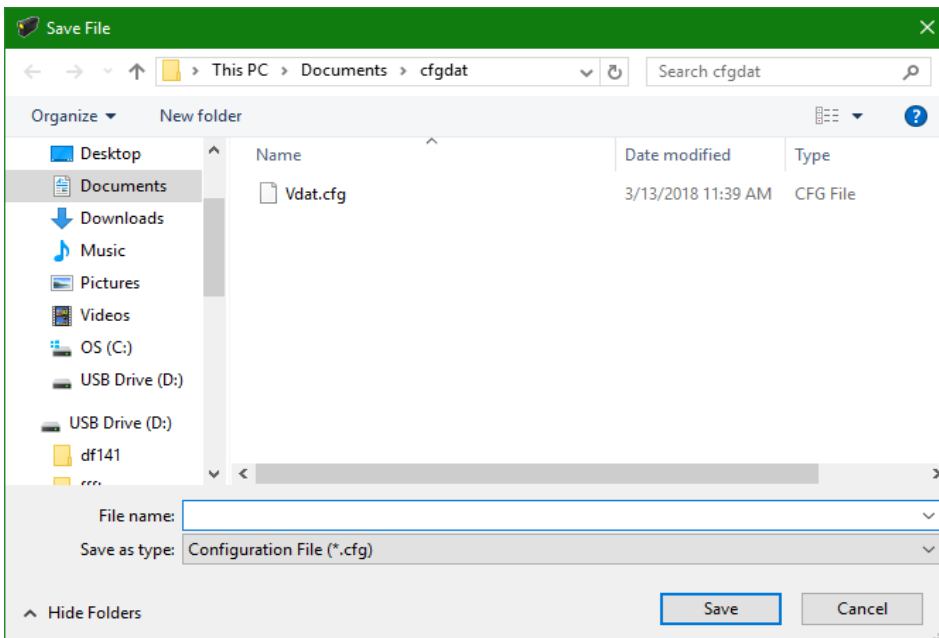
Clicking [Open File] calls up the Windows-standard Open dialog box, depending on the PC's operating system on which M1E4CFG is running.



Select a parameter file and click [Open] to show the stored parameters in the [File Configuration] frame.  
In order to write the parameters to the connected device, click [<Download] button.

### 7-2. SAVING PARAMETERS IN A FILE

Clicking [Save File] calls up the Windows-standard Save As dialog box, depending on the PC's operating system on which M1E4CFG is running.



Enter a desired file name to File Name field and click [Save] to store the parameters in the [File Configuration] frame.

**NOTE:** DO NOT overwrite a saved file with a text editor or the like, otherwise errors may occur when reading the file.

## 8. PARAMETER DETAILS

### 8-1. PARAMETER LIST

Supported parameters depend upon model types as shown in the following table.

		M1EXV-4	Page
Ch1 / Ch2 / Ch3 / Ch4 Setting	Channel Enable	✓	15
	Input range	✓	15
	0% input setting / 100% input setting	✓	15
	0% input scaling / 100% input scaling	✓	16
	Input scaling decimal point	✓	16
	Input decimal point	✓	16
	Unit (INP scaling)	✓	16
	User unit setting	✓	16
	Output range	✓	16
	0% output setting / 100% output setting	✓	16
	Filter time constant	✓	16
	Input Zero fine adjust / Input Span fine adjust	✓	16
	Output Zero fine adjust / Output Span fine adjust	✓	16
Advanced	Upper display setting	✓	17
	Lower display setting	✓	17
	Brightness	✓	17
	Display timeout	✓	17
	Display change time	✓	17
Ch1 / Ch2 / Ch3 / Ch4 Linearizer	User's table linearization	✓	18
	Number of points	✓	18
	Table	✓	19

### 8-2. CH1 SETTING / CH2 SETTING / CH3 SETTING / CH4 SETTING

#### 8-2-1. CHANNEL ENABLE

Enable or disable each channel.

Enable  
Disable

**NOTE:** Parameter settings can be performed even when the channel is disabled.

#### 8-2-2. INPUT RANGE

Select input range of the device from the following table.

SYMBOL	INPUT RANGE
–	-10 – +10 V -5 – +5 V 0 – 20 mA

**NOTE:** When the input range is changed, [0% input setting], [100% input setting], [Input Zero fine adjust] and [Input Span fine adjust] of the channel return to initial values.

#### 8-2-3. 0% INPUT SETTING / 100% INPUT SETTING

Set 0% and 100% input signals according to the selected input range.

For example, when the input signal is 1 – 5 V DC with the [Input range] -5 – +5 V, set [0% input setting] to 1.000 and [100% input setting] to 5.000.

1.000 to 5.000 V input will be scaled to 0% to 100%.

SYMBOL	INPUT	SETTING RANGE	MIN. SPAN
–	-10 – +10 V	-10.000 – 10.000	1.000
	-5 – +5 V	-5.000 – 5.000	0.250
	0 – 20 mA	0.000 – 20.000	1.000

#### 8-2-4. 0% INPUT SCALING / 100% INPUT SCALING

Set scaling values for [0% input setting] and [100% input setting].

For example, when:

[input range] is set to -10 – +10 V;

[0% input setting] to -10.000;

[100% input setting] to 10.000;

[0% input scaling] to 0; and

[100% input scaling] to 10000,

-10 to +10 V input will be scaled to 0 to 10000 and shown on the display of the device.

Set [0% input scaling] and [100% input scaling] within the range of -99999 to 999999.

#### 8-2-5. INPUT SCALING DECIMAL POINT

Set decimal point position for [Input scaling] from among None, 1, 2, 3, 4, and 5 places of decimals.

#### 8-2-6. UNIT (INP SCALING)

Select unit for [Input scaling] from among the following 68 units:

DC, AC, mV, V, kV,  $\mu$ A, mA, A, kA, mW, W, kW, var, kvar, Mvar, VA, Hz,  $\Omega$ , k $\Omega$ , M $\Omega$ , cm, mm, m, m/sec, mm/min, cm/min, m/min, m/h, m/s<sup>2</sup>, inch, L, L/s, L/min, L/h, m<sup>3</sup>, m<sup>3</sup>/sec, m<sup>3</sup>/min, m<sup>3</sup>/h, Nm<sup>3</sup>/h, N·m, N/m<sup>2</sup>, g, kg, kg/h, N, kN, Pa, kPa, MPa, t, t/h, °C, °F, K, %RH, J, kJ, MJ, rpm, sec, min, min<sup>-1</sup>, pH, %, ppm, deg, (blank), User

#### 8-2-7. USER UNIT

Set your desired unit using characters shown below when User is selected in [Unit (INP scaling)].

A unit can be created by using up to any 13 characters.

Settable characters: 0–9 A–Z a–z ! “ # \$ % & ‘ ( ) = - + \* ^ | @ ` [ ] { } ; : < > ? \_ , . /

#### 8-2-8. OUTPUT RANGE

Select output range of the device from the following table.

-10 – +10 V

-5 – +5 V

0 – 20 mA

NOTE: When the output range is changed, [0% output setting], [100% output setting], [Output Zero fine adjust], and [Output Span fine adjust] of the channel return to initial values.

#### 8-2-9. 0% OUTPUT SETTING / 100% OUTPUT SETTING

Set 0% and 100% output signals according to the selected output range.

For example, when the output signal is 4 – 20 mA with the [Output range] 0 – 20 mA, set [0% output setting] to 4.000 and [100% output setting] to 20.000.

4.00 to 20.00 mA output will be scaled to 0% to 100%.

OUTPUT	SETTING RANGE	MIN. SPAN
-10 – +10 V	-10.000 – 10.000	1.000
-5 – +5 V	-5.000 – 5.000	0.250
0 – 20 mA	0.000 – 20.000	1.000

#### 8-2-10. FILTER TIME CONSTANT

First order lowpass filter can be set with the specified time constant.

When set to '0', the first order lowpass filter is not available.

Set the time constant within the range of 1 to 30 seconds.

The first order lag filter is equivalent to ordinary CR filters and the set time constant is the time taken for output to follow up to about 63 % when input varies from 0 % to 100 %.

#### 8-2-11. INPUT ZERO FINE ADJUST / INPUT SPAN FINE ADJUST

Input engineering unit value can be adjusted.

The adjustable ranges of the [Input Zero fine adjust] and [Input Span fine adjust] vary depending on the models.

See the table below.

SYMBOL	ADJUSTABLE RANGE	
	INPUT ZERO FINE ADJUST	INPUT SPAN FINE ADJUST
–	-5.000 – +5.000%	95.000 – 105.000%

#### 8-2-12. OUTPUT ZERO FINE ADJUST / OUTPUT SPAN FINE ADJUST

Output engineering unit value can be adjusted.

Set [Output Zero fine adjust] and [Output Span fine adjust] within the range of -5.000 – +5.000 (%) and 95.000 – 105.000 (%), respectively.



## 8-3. ADVANCE - ADVANCED SETTING

### 8-3-1. UPPER DISPLAY SETTING

Information to be displayed on the upper display of the device in the measuring mode can be selected from the table below. Displays 1 to 4 can be configured.

SYMBOL	UPPER DISPLAY SETTING
–	Ch1 Input engineering unit value Ch1 Input scaling Ch1 Percent value (*1) Ch1 Output engineering unit value Ch2 Input engineering unit value Ch2 Input scaling Ch2 Percent value (*1) Ch2 Output engineering unit value Ch3 Input engineering unit value Ch3 Input scaling Ch3 Percent value (*1) Ch3 Output engineering unit value Ch4 Input engineering unit value Ch4 Input scaling Ch4 Percent value (*1) Ch4 Output engineering unit value No display (*2)

(\*1) Percent value for input.

(\*2) Not selectable for Display 1.

### 8-3-2. LOWER DISPLAY SETTING

Information to be displayed on the lower display of the device in the measuring mode can be selected from the table below. Displays 1 to 4 can be configured.

“No display” is automatically set when “No display” is selected at [UPPER DISPLAY SETTING].

SYMBOL	LOWER DISPLAY SETTING
–	Ch1 Input engineering unit value Ch1 Input scaling Ch1 Percent value (*) Ch1 Output engineering unit value Ch2 Input engineering unit value Ch2 Input scaling Ch2 Percent value (*) Ch2 Output engineering unit value Ch3 Input engineering unit value Ch3 Input scaling Ch3 Percent value (*) Ch3 Output engineering unit value Ch4 Input engineering unit value Ch4 Input scaling Ch4 Percent value (*) Ch4 Output engineering unit value No display

(\*) Percent value for input.

### 8-3-3. BRIGHTNESS

Adjust display brightness of the device.

Settable range: 1 (darkest) – 4 (brightest)

### 8-3-4. DISPLAY TIMEOUT

Set a timeout period to turn off the display when there is no operation within a certain time period.

Settable range: 0 – 60 minutes

To keep the display always on, set to 0.

### 8-3-5. DISPLAY CHANGE TIME

The displays having been set switch at preset time intervals.

Settable range: 0 – 60 seconds

Set to '0' when the display need not switch automatically.

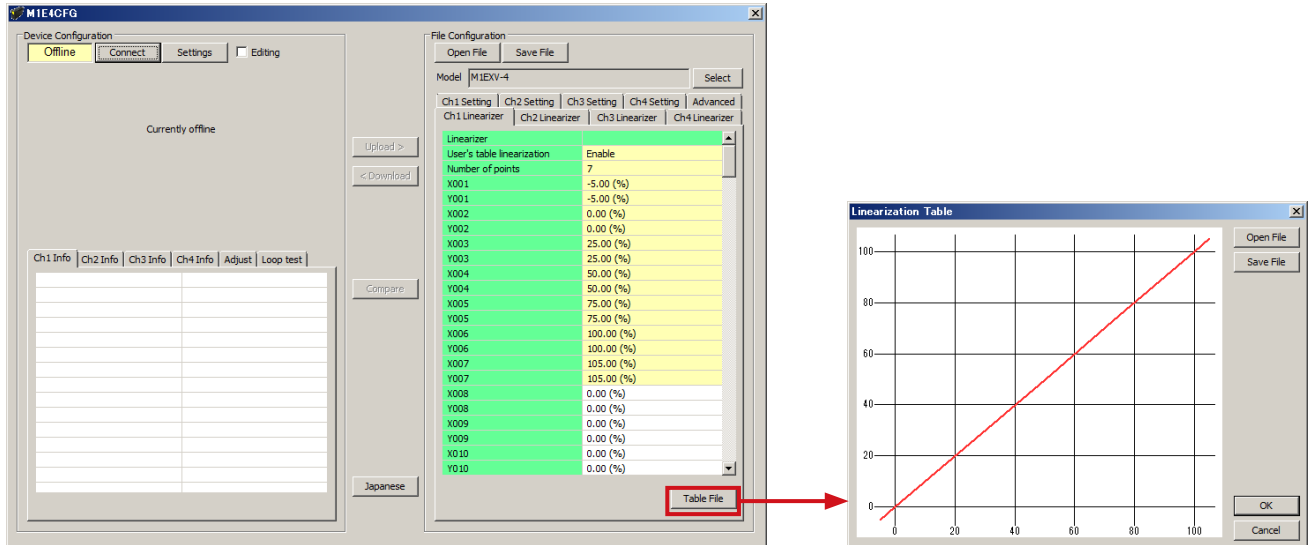
## 8-4. LINEARIZER – LINEARIZATION SETTING

In each [Linearizer] tab, multiple pairs (points) of input (X) and output (Y) values can be specified to convert I/O to a line chart.

A user-specified linearization table can be manually input or read and imported from a table file.

Click [Table File] button to open the 'Linearization Table' window and click [Open File] to open a table file, or click [Save File] to save the table as a table file.

Note: [Table File] button is active only when [User's table linearization] is set to "Enable".



Refer to "9. APPENDIX" on page 20 for detailed table format.

### 8-4-1. USER'S TABLE LINEARIZATION

Enable or disable linearization with a user-specified table.

Disable

Enable

When set to [Disable], I/O conversion with a user-specified table is not performed.

When set to [Enable], input is converted into output according to the user-specified table.

### 8-4-2. NUMBER OF POINTS

Specify the number of points to be set for the linearization table.

Settable range: 2 to 111

When a table file is read, the number is automatically updated according to the available number of  $X_n$ ,  $Y_n$  pairs.

**8-4-3. LINEARIZATION TABLE**

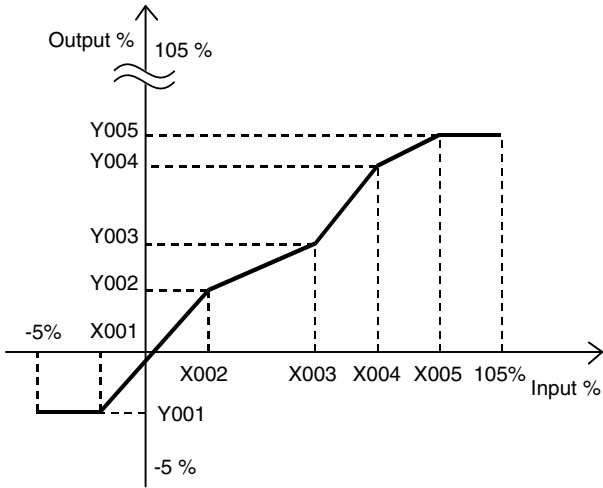
Specify a user-specified table used for I/O conversion.

Both X and Y adjustable range is -5 to +105 (%).

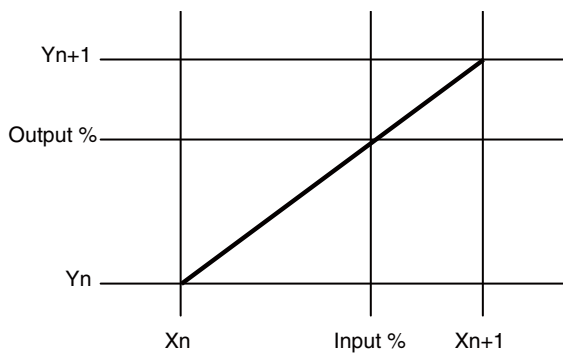
X values need to be set in ascending order from X001; otherwise conversion cannot be correctly performed.

Conversion is performed based on the user specified table in which values of X corresponding to input (unit: %) and values of Y corresponding to output (unit: %) are paired, respectively.

The table is searched for an X value that matches the input to be converted, and a Y value paired with the X value is outputted.



When the input to be converted does not match any X value in the table, two X values which are closest to the input in positive and negative directions are selected and linearly interpolated, thereby obtaining a Y value to be outputted.



If one of closest X values is out of the table range, a value of Y paired with the other X is outputted.

## 9. APPENDIX

### 9-1. USER TABLE FILE FORMAT

The following indicates the format of user-specified table files used in linearization.

A user specified table file includes contents of a user-specified table used in linearization:  
The file is saved as a text file and data is formatted as follows.

```
/* User linearization table comment */  
{  
    -5.00,      -5.00  
    0.00,       1.00  
    50.00,     49.00  
    105.00     105.00  
}
```

The bracket '{' in the second row indicates the beginning of the table, while the '}' in the last row indicates the end.

Write so that the second and last row contain only '{' and '}', respectively.

In each row, X<sub>n</sub> and Y<sub>n</sub> are paired and separated by comma.

In the same manner as setting on M1E4CFG, values are represented in percentage and set within the range of -5.00 to +105.00% (two decimal places), and X<sub>n</sub> values need to be arranged in ascending order.

Max. 111 pairs of 'X<sub>n</sub>, Y<sub>n</sub>' can be included.

The row starting with '/' is recognized as a comment.

A table file must be saved with extension "txt".