

For Super-mini Signal Conditioners with Display M1E-UNIT

M1E CONFIGURATOR SOFTWARE

Model: M1ECFG

USERS MANUAL

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CONTENTS

1. INTRODUCTION	4
1-1. GENERAL DESCRIPTION	4
1-2. APPLICABLE DEVICES.....	4
1-3. PC REQUIREMENTS	4
1-4. INSTALLING & UNINSTALLING THE PROGRAM	4
2. GETTING STARTED	5
2-1. STARTING THE M1ECFG	5
2-2. TERMINATION.....	5
2-3. SCREEN COMPONENT IDENTIFICATION.....	5
2-4. CONNECTING TO THE DEVICE	6
3. DEVICE INFO - DEVICE INFORMATION	7
4. SETTING PARAMETERS	8
4-1. PARAMETER SETTING IN [DEVICE CONFIGURATION].....	8
4-1-1. CH1 SETTING / CH2 SETTING.....	8
4-1-2. RANGE – RANGE SETTING	9
4-2. PARAMETER SETTING IN [FILE CONFIGURATION].....	12
4-2-1. UPLOAD.....	12
4-2-2. DOWNLOAD	12
4-2-3. EDIT	12
4-3. COMPARING SETTING VALUES IN THE DEVICE	13
4-4. HOW TO SETUP I/O (EXAMPLE).....	13
4-4-1. CONNECTING TO THE DEVICE	13
4-4-2. CONFIGURATION EXAMPLES OF CH1 SETTING / CH2 SETTING.....	14
4-4-3. OTHER SETTINGS	17
5. ADJUST - FINE ADJUSTMENTS	18
6. LOOP TEST	19
7. READING / SAVING FILES	20
7-1. READING SETTING PARAMETERS SAVED AS FILE.....	20
7-2. SAVING PARAMETERS IN A FILE	20
8. PARAMETER DETAILS	21
8-1. PARAMETER LIST	21
8-2. CH1 SETTING / CH2 SETTING.....	21
8-2-1. TEMPERATURE UNIT R T	21
8-2-2. INPUT RANGE V R T	22
8-2-3. 0% INPUT SETTING / 100% INPUT SETTING	22
8-2-4. ANGLE OFFSET / ANGLE SPAN S	23
8-2-5. ROTATING DIRECTION S	23
8-2-6. 0% INPUT SCALING / 100% INPUT SCALING V M S	23
8-2-7. INPUT SCALING DECIMAL POINT V M S	23
8-2-8. INPUT DECIMAL POINT R T	23
8-2-9. UNIT (INP SCALING) V M S	23

8-2-10. USER UNIT <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	23
8-2-11. BURNOUT <input type="checkbox"/> <input type="checkbox"/>	23
8-2-12. SENSOR WIRES <input type="checkbox"/>	23
8-2-13. WIRE RESISTANCE <input type="checkbox"/>	24
8-2-14. COLD JUNCTION COMPENSATION <input type="checkbox"/>	24
8-2-15. TERMINAL TEMPERATURE <input type="checkbox"/>	24
8-2-16. OUTPUT RANGE	24
8-2-17. 0% OUTPUT SETTING / 100% OUTPUT SETTING	24
8-2-18. OVERRANGE OUTPUT < 0% / OVERRANGE OUTPUT > 100% <input type="checkbox"/>	24
8-2-19. FILTER TIME CONSTANT	24
8-2-20. INPUT ZERO FINE ADJUST / INPUT SPAN FINE ADJUST <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	25
8-2-21. OUTPUT ZERO FINE ADJUST / OUTPUT SPAN FINE ADJUST	25
8-3. ADVANCE - ADVANCED SETTING	25
8-3-1. UPPER DISPLAY SETTING	25
8-3-2. LOWER DISPLAY SETTING	26
8-3-3. CHANNEL ENABLE	26
8-3-4. BRIGHTNESS	26
8-3-5. DISPLAY TIMEOUT	26
8-4. LINEARIZER – LINEARIZATION SETTING <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	27
8-4-1. USER'S TABLE LINEARIZATION <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	27
8-4-2. NUMBER OF POINTS <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	27
8-4-3. TABLE <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	28
9. APPENDIX	28
9-1. USER TABLE FORMAT <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	28

1. INTRODUCTION

1-1. GENERAL DESCRIPTION

M-System M1ECFG is used to program parameters for Super-mini Signal Conditioners with Display M1E-UNIT series (referred hereunder as 'device'). The following major functions are available:

- 1) Edit parameters online (connected to the device) in real time
- 2) Edit parameters offline (not connected to the device)
- 3) Download parameters to the device, upload parameters from the device
- 4) Save parameters as files, read parameters from files
- 5) Compare parameters edited on the screen with the ones stored in the device

1-2. APPLICABLE DEVICES

The M1ECFG is applicable to the following products:

FUNCTION	MODEL	SYMBOL	VERSION
Signal Transmitter	M1EXV	V	1.00.0019
Potentiometer Transmitter	M1EXM	M	1.00.0018
RTD Transmitter	M1EXR	R	1.00.0010
Thermocouple Transmitter	M1EXT	T	1.00.0005
Self-Synch Transmitter	M1EXS	S	1.00.0015

The lowest software version applicable to each hardware model is indicated in the above table.

Confirm that the software you have is compatible with the hardware you have.

The latest version of the M1ECFG is downloadable at M-System's web site (www.m-system.co.jp) if you need higher version software.

In this manual, descriptions given with the above symbols are applied only to the models those symbols are assigned to. 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 M1ECFG.

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 also required to connect the device to the PC.

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

Use "Smaller - 100%" of "Make text and other items larger or smaller" on the display of the Windows.

The display may be jumbled with other than the text size "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 M1ECFG 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 M1ECFG from the program list and click [Uninstall] button.
- For Windows 10, open Settings from Start menu > System > Apps & features. Select the M1ECFG from the program list and click [Uninstall] button.

2. GETTING STARTED

2-1. STARTING THE M1ECFG

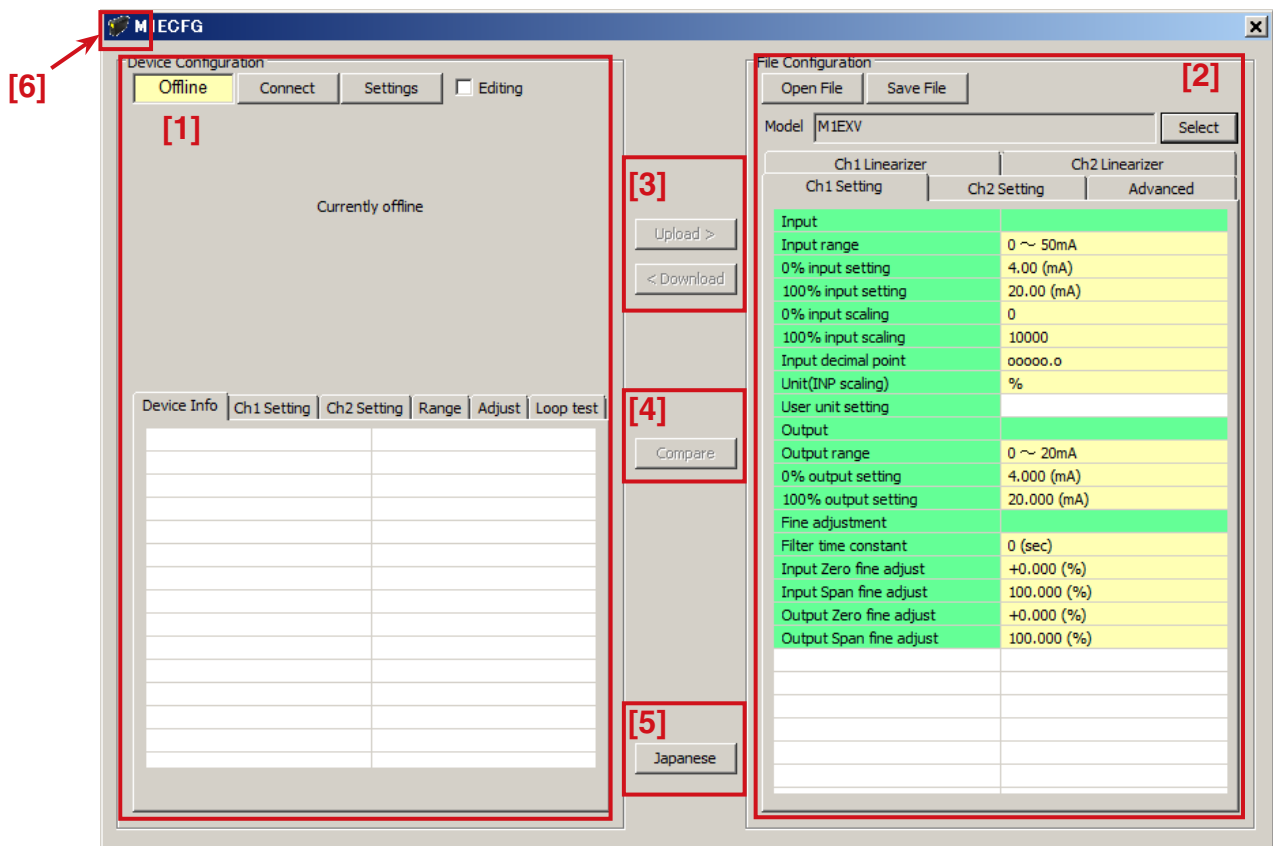
- For Windows 7, open Program > M-SYSTEM > Configurator > M1ECFG,
- for Windows 8.1, open All Apps on the Start screen > M-SYSTEM > M1ECFG
- for Windows 10, open All Apps on the Start menu > M-SYSTEM > M1ECFG
to start up the M1ECFG on the Windows PC.


2-2. TERMINATION

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

2-3. SCREEN COMPONENT IDENTIFICATION

The following table shows descriptions of each screen component.



[1] Device Configuration	You can set a communication port, connect and disconnect the M1ECFG with the device. Basic parameters of the device presently connected are shown and can be edited online, which are reflected in the device in real time.
[2] File Configuration	All parameters are shown and can be edited regardless of the connection with the device. The edited parameters can be saved in files and a parameter setting saved in a file can be read.
[3] Upload Download	[Upload] button is to read parameters of a device and show them in the [File Configuration] frame, and [Download] button is to write edited parameters into a device.
[4] Compare	A button to compare the parameters of the connected device with those edited in the [File Configuration] frame. The parameters showing difference are highlighted in the red background.
[5] English / Japanese	A button to switch the display language. Clicking the button switches between English and Japanese. The program starts up in English mode as initial state when the OS is other than Japanese version. You can switch 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 M1ECFG...], and the version No. dialog box will appear.

2-4. CONNECTING TO THE DEVICE

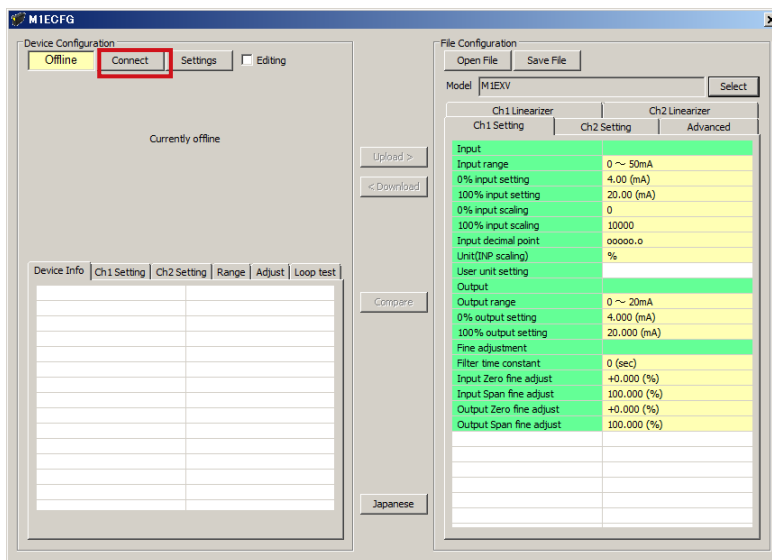
When the PC starts communication with the device, the [Device Info], [Ch1 Setting], [Ch2 Setting], [Range], [Adjust] and [Loop test] in the [Device Configuration] frame are shown, where you can edit and adjust the parameters.

Note 1: The connected device needs to be in Lock state since the configuration with the M1ECFG is not available if the device is in Unlock state.

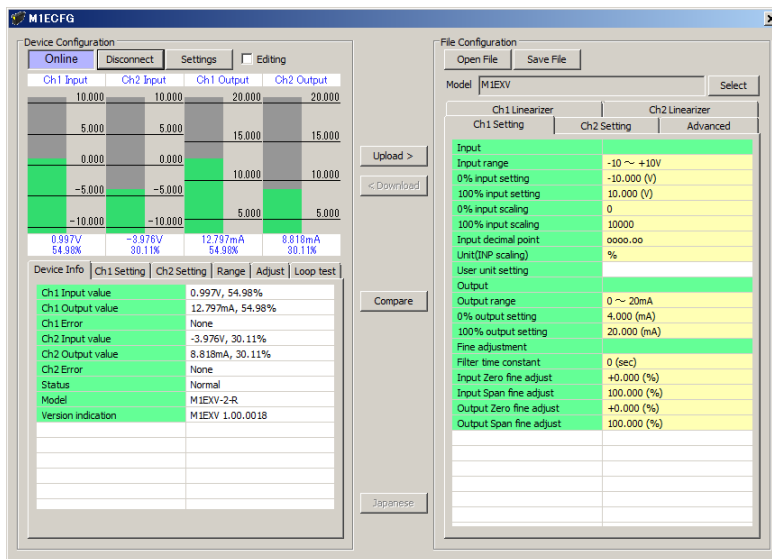
Note 2: The [File Configuration] shows initial values of the model indicated in the [Model] field, and they may be different from the setting parameters in the [Device Configuration] frame. Click [Upload] to read setting parameters from the device connected to the M1ECFG and show them in the [File Configuration] frame.

Click [Settings] to choose the COM port number to which the device is connected. Once a COM port is specified after the M1ECFG has been installed and started, you do not need to repeat the setting procedure until you want to change the COM port setting.

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



The device's present parameters are uploaded and shown in the [Device Configuration] frame.



The bargraph on the screen shows real time I/O status of the device, and you can now access to the menu tabs such as [Device Info], [Ch1 Setting], [Ch2 Setting], [Range], [Adjust] and [Loop test].

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

The scales of the input bargraph for **S** are drawn for the range 0 – 360°.

When the configurator cable is disconnected, the display in the [Device Info] tab disappears and the M1ECFG is ready to be connected to another device. In order to continue, just connect a new device. You do not need to click [Connect] button. The device is automatically connected when the cable is inserted. Click [Disconnect] to terminate the communication with the device.

3. DEVICE INFO - DEVICE INFORMATION

When the PC starts to communicate with the device, the [Device Configuration] shows present I/O data and status, model number and other information.

Device Info	Ch1 Setting	Ch2 Setting	Range	Adjust	Loop test
Ch1 Input value	-5.978V, 20.10%				
Ch1 Output value	-2.989V, 20.10%				
Ch1 Error	None				
Ch2 Input value	-2.999V, 35.00%				
Ch2 Output value	9.600mA, 35.00%				
Ch2 Error	None				
Status	Normal				
Model	M1EXV-2-R				
Version indication	M1EXV 1.00.0014				

Item	Explanations																								
Ch1 / Ch2 Input value	Current input value is indicated in engineering unit and in percentage.																								
Ch1 / Ch2 Output value	Current output value is indicated in engineering unit and in percentage.																								
Status	Current device status shown below is indicated. (When multiple status displays occur at the same time, the highest priority status is displayed.)																								
	<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 M1ECFG operation.(The fixed I/O with the front button control of the device is not indicated here.) (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 with the M1ECFG. The checkmark of 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 M1ECFG operation.(The fixed I/O with the front button control of the device is not indicated here.) (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 with the M1ECFG. The checkmark of 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)																							
Ch1 / Ch2 Error	Current device error shown below is indicated. (When multiple errors occur at the same time, the highest priority error is displayed.)																								
	<table border="1"> <thead> <tr> <th>Error Message</th> <th>Priority</th> <th>Status</th> </tr> </thead> <tbody> <tr> <td>BURNOUT ERROR D R T</td> <td>1</td> <td>Input wires broken (output downward)</td> </tr> <tr> <td>BURNOUT ERROR U R T</td> <td>1</td> <td>Input wires broken (output upward)</td> </tr> <tr> <td>OVER RANGE D</td> <td>2</td> <td>Input value is less than -5%.</td> </tr> <tr> <td>OVER RANGE U</td> <td>2</td> <td>Input value exceeds 105%.</td> </tr> <tr> <td>SCALING ERROR D V M S</td> <td>3</td> <td>Calculated result of input scaling value is less than -99999.</td> </tr> <tr> <td>SCALING ERROR U V M S</td> <td>3</td> <td>Calculated result of input scaling value exceeds 999999.</td> </tr> <tr> <td>None</td> <td>4</td> <td>No error</td> </tr> </tbody> </table>	Error Message	Priority	Status	BURNOUT ERROR D R T	1	Input wires broken (output downward)	BURNOUT ERROR U R T	1	Input wires broken (output upward)	OVER RANGE D	2	Input value is less than -5%.	OVER RANGE U	2	Input value exceeds 105%.	SCALING ERROR D V M S	3	Calculated result of input scaling value is less than -99999.	SCALING ERROR U V M S	3	Calculated result of input scaling value exceeds 999999.	None	4	No error
Error Message	Priority	Status																							
BURNOUT ERROR D R T	1	Input wires broken (output downward)																							
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SCALING ERROR U V M S	3	Calculated result of input scaling value exceeds 999999.																							
None	4	No error																							
Ch1 / Ch2 RTD resistance R	Shows the resistance value of the RTD connected to the device.																								
Ch1 / Ch2 CJM temperature T	Shows the temperature measured with the Cold Junction Compensation Sensor (CJM) of the device. Or shows the set temperature in using the fixed terminal temperature without using the CJM.																								
Ch1 / Ch2 Input EMF value T	Shows the electromotive force of the thermocouple connected to the device.																								
Model	Model number of the device Note: Ex-factory model number is indicated. Actual model suffix codes may differ if the I/O has been changed at site.																								
Version indication	Firmware revision number of the device																								

4. SETTING PARAMETERS

To set parameters, [Device Configuration] to edit the basic settings in real time such like input range and scaling of the device, and [File Configuration] to edit all setting parameters regardless of the communication with the device are available.

4-1. PARAMETER SETTING IN [DEVICE CONFIGURATION]

The [Device Configuration] includes [Ch1 Setting] and [Ch2 Setting] to modify each setting value, and [Range] to set the 0% and 100% input using actual input signals.

4-1-1. CH1 SETTING / CH2 SETTING

Parameters in the [Ch1 Setting] and [Ch2 Setting] tabs can be edited. The parameter items on the screen depend upon models.

Device Info	Ch1 Setting	Ch2 Setting	Range	Adjust	Loop test
Input					
Input range			-10 ~ +10V		
0% input setting			-10.000 (V)		
100% input setting			10.000 (V)		
0% input scaling			0		
100% input scaling			10000		
Input decimal point			0000.00		
Unit(INP scaling)			%		
User unit setting					
Output					
Output range			-5 ~ +5V		
0% output setting			-5.000 (V)		
100% output setting			5.000 (V)		
Fine adjustment					
Filter time constant			0 (sec)		

Check the [Editing] box, and the modifiable parameters will be highlighted in the light yellow background. Click such a parameter field to show a pull-down list or an edit box to modify the value. Modifications are reflected in the device immediately.

Pull-down menu: For example, click the [Input range] field. When a pull-down menu is displayed as shown below, select your desired range.

Device Info	Ch1 Setting	Ch2 Setting	Range	Adjust	Loop test
Input					
Input range			-10 ~ +10V		
0% input setting			0 ~ 50mA		
100% input setting			-1000 ~ +1000mV		
0% input scaling			-10 ~ +10V		
100% input scaling			0		
100% input scaling			10000		
Input decimal point			0000.00		
Unit(INP scaling)			%		
User unit setting					
Output					
Output range			-5 ~ +5V		
0% output setting			-5.000 (V)		
100% output setting			5.000 (V)		
Fine adjustment					
Filter time constant			0 (sec)		

Edit box: For example, click the [0% input scaling] field. When an edit box is displayed as shown left, enter your desired value and press Enter key.

Device Info	Ch1 Setting	Ch2 Setting	Range	Adjust	Loop test
Input					
Input range	-10 ~ +10V				
0% input setting	-10.000 (V)				
100% input setting	10.000 (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					
Output range	-5 ~ +5V				
0% output setting	-5.000 (V)				
100% output setting	5.000 (V)				
Fine adjustment					
Filter time constant	0 (sec)				

Model specific setting parameter items and ranges are explained in “8. PARAMETER DETAILS” on page 21.

4-1-2. RANGE – RANGE SETTING

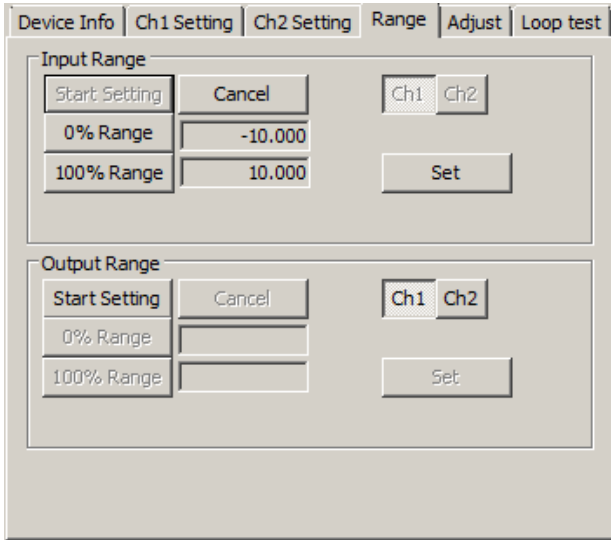
[0% input setting], [100% input setting], [0% output setting] (For , [Angle offset] [Angle span]), and [100% output setting] can be performed using the actual input signals in the [Range] tab.

Device Info	Ch1 Setting	Ch2 Setting	Range	Adjust	Loop test
Input Range					
Start Setting	Cancel	Ch1	Ch2		
0% Range	<input type="text"/>				
100% Range	<input type="text"/>	Set			
Output Range					
Start Setting	Cancel	Ch1	Ch2		
0% Range	<input type="text"/>				
100% Range	<input type="text"/>	Set			

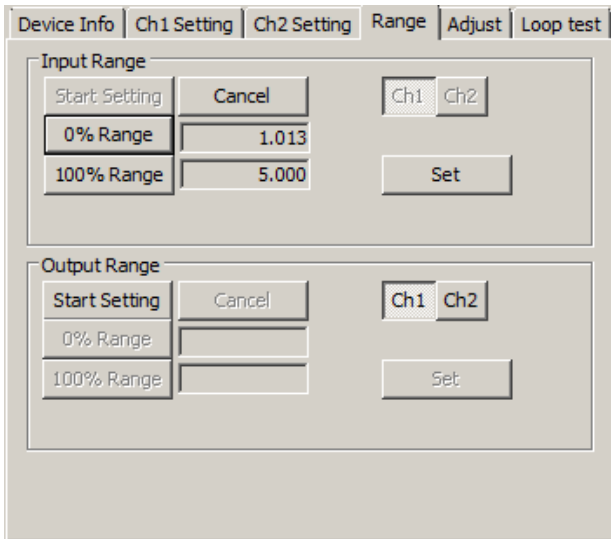
Device Info	Ch1 Setting	Ch2 Setting	Range	Adjust	Loop test
Input Range					
Start Setting	Cancel	Ch1	Ch2		
Angle offset	<input type="text"/>				
Angle span	<input type="text"/>	Set			
Output Range					
Start Setting	Cancel	Ch1	Ch2		
0% Range	<input type="text"/>				
100% Range	<input type="text"/>	Set			

4-1-2-1. M1EXV CONFIGURATION EXAMPLE

1) Click [Ch1] or [Ch2] button in the [Input Range] to select a channel to set. Then click [Start Setting] button to move on to the mode where [0% input setting] and [100% input setting] can be set with the actual input. [0% Range], [100% Range], [Set], and [Cancel] buttons are enabled as shown left.



2) Apply desired 0% input value to the device and click [0% Range] button. Then apply desired 100% input value and click [100% Range] button. Each input in the engineering unit is indicated next to each button. For example, input 1V and click [0% Range] button, then input 5V and click [100% Range] button. The screen will be as shown left.



Click [Set] button, and the indicated values will be set to [0% input setting] and [100% input setting] in the [Ch1 Setting] tab.

Click [Cancel] button to cancel the range setting mode and discard the set values.

Similar procedure is applicable when setting [0% output setting] and [100% output setting]. However, you must vary the simulated input signal levels until the monitored output shows a desired 0% output or 100% output before clicking [0% Range] and [100% Range] buttons. Click [Set] button to set.

Similar procedure is applicable with **M**, **R** and **T**.

4-1-2-2. M1EXS CONFIGURATION EXAMPLE

1) Click [Ch1] or [Ch2] button in the [Input Range] to select a channel to set. Then click [Start Setting] button to move on to the mode where [0% input setting] and [100% input setting] can be set with the actual input. [Angle offset], [Angle span], [Set], and [Cancel] buttons are enabled as shown below.

Device Info	Ch1 Setting	Ch2 Setting	Range	Adjust	Loop test
Input Range					
Start Setting	Cancel	Ch1	Ch2		
Angle offset	0.00			Set	
Angle span	270.00				
Output Range					
Start Setting	Cancel	Ch1	Ch2		
0% Range				Set	
100% Range					

2) Apply desired 0% input value to the device and click [Angle offset] button. Then apply desired 100% input value and click [Angle span] button. Angle offset value and Angle span value are indicated next to each button. For example, input 90° and click [Angle offset] button, then input 210° and click [Angle span] button. The screen will be as shown below.

Device Info	Ch1 Setting	Ch2 Setting	Range	Adjust	Loop test
Input Range					
Start Setting	Cancel	Ch1	Ch2		
Angle offset	89.98			Set	
Angle span	210.12				
Output Range					
Start Setting	Cancel	Ch1	Ch2		
0% Range				Set	
100% Range					

Click [Set] button, and the indicated values will be set to [Angle offset] and [Angle span] in the [Ch1 Setting] tab.

Click [Cancel] button to cancel the range setting mode and discard the set values.

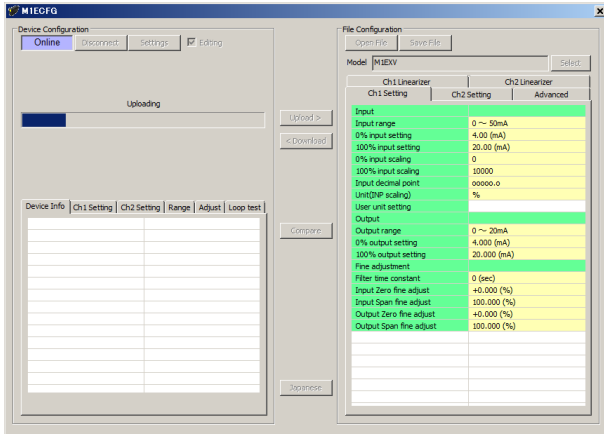
Similar procedure is applicable when setting [0% output setting] and [100% output setting]. However, you must vary the simulated input signal levels until the monitored output shows a desired 0% output or 100% output before clicking [0% Range] and [100% Range] buttons. Click [Set] button to set.

4-2. PARAMETER SETTING IN [FILE CONFIGURATION]

All setting parameters can be edited in the [File Configuration] frame. Read parameters from the device (upload), edit them, and then write them to the device (download). You can also save settings in a file, read, write, and edit a file without connecting to the device. To save and read files, refer to “7. READING / SAVING FILES” on page 20.

4-2-1. UPLOAD

Click [Upload] while the PC communicates with the device. The M1ECFG starts reading parameters stored in the connected device. A progress bar [Uploading] is indicated on the screen until the uploading is complete.



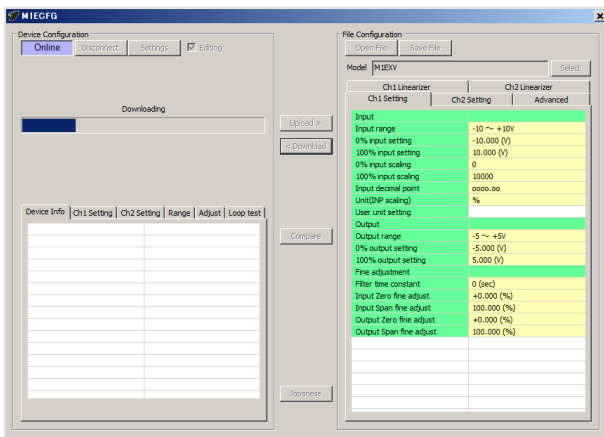
When the uploading is complete, the parameters are shown within the [File Configuration] frame and can be edited.

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.

4-2-2. DOWNLOAD

When you finish editing parameters, click [Download] while the PC communicates with the device. The M1ECFG starts writing parameters edited on the screen to the connected device. A progress bar [Downloading] is indicated on the screen until the downloading is complete.



When the downloading 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.

4-2-3. EDIT

Click a value field, and a pull-down menu or an edit box will be displayed. Select or enter your desired value. The procedure is the same as that described in “4-1-1. CH1 SETTING / CH2 SETTING” on page 8.

When you finish editing parameters, write them to the device in order to reflect them immediately in the same procedure as that described in “4-2-2. DOWNLOAD” on page 12. To save them in a file, refer to “7-2. SAVING PARAMETERS IN A FILE” on page 20.

Model specific setting parameter items and ranges are explained in “8. PARAMETER DETAILS” on page 21.

4-3. COMPARING SETTING VALUES IN THE DEVICE

Setting parameters presently edited on the screen (file setting) and those stored in the connected device (device setting) can be compared side by side. Edited parameters can be compared with those in a file if you open it in advance with [Open File] button, or with those of another device if you upload in advance with [Upload] button.

Clicking [Compare] button starts reading setting parameters from the connected device.

Setting Mode	Setting Parameter	Device Configuration	File Configuration
Ch1 Setting	Input range	-10 ~ +10V	0 ~ 50mA
Ch1 Setting	0% input setting	-10.000 (V)	4.00 (mA)
Ch1 Setting	100% input setting	10.000 (V)	20.00 (mA)
Ch1 Setting	0% input scaling	0	0
Ch1 Setting	100% input scaling	10000	10000
Ch1 Setting	Input decimal point	0000.00	00000.0
Ch1 Setting	Unit(INP scaling)	%	%
Ch1 Setting	User unit setting		
Ch1 Setting	Output range	-5 ~ +5V	0 ~ 20mA
Ch1 Setting	0% output setting	-5.000 (V)	4.000 (mA)
Ch1 Setting	100% output setting	5.000 (V)	20.000 (mA)
Ch1 Setting	Filter time constant	0 (sec)	0 (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	Input range	-10 ~ +10V	0 ~ 50mA
Ch2 Setting	0% input setting	-10.000 (V)	4.00 (mA)
Ch2 Setting	100% input setting	10.000 (V)	20.00 (mA)
Ch2 Setting	0% input scaling	0	0
Ch2 Setting	100% input scaling	10000	10000
Ch2 Setting	Input decimal point	0000.00	00000.0
Ch2 Setting	Unit(INP scaling)	%	%
Ch2 Setting	User unit setting		

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

The rows showing differences between [Device Configuration] and [File Configuration] are highlighted in the red background. The total number of non-matching parameters is mentioned 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.

4-4. HOW TO SETUP I/O (EXAMPLE)

General configurations that can be performed using the M1ECFG are described using examples.

4-4-1. CONNECTING TO THE DEVICE

Start up the M1ECFG. Click [Settings] button and choose or confirm the COM port to which the device is connected and click [Connect].

The PC starts to communicate with the device. Present parameter setting is uploaded and displayed under the [Device Configuration] on the screen. Check the [Editing] box so that you can now change the parameters in the [Device Configuration] frame.

Note 1: The connected device needs to be in Lock state since the [Editing] box cannot be checked if the connected device is in Unlock state.

Note 2: Disable Fixed I/O since the [Editing] box cannot be checked during a loop test (fixed I/O).

Note 3: It is not necessary to check the [Editing] box to edit the parameters in the [File Configuration] frame. Click [Upload] to read the parameters from the device.

4-4-2. CONFIGURATION EXAMPLES OF CH1 SETTING / CH2 SETTING

Configuration examples in the [Ch1 Setting] and [Ch2 Setting] tabs per model are described here. The edited parameters are reflected in the device immediately.

Note: The edited parameters in the [File Configuration] frame are not reflected in the device in real time. Click [Download] button to write them to the device.

4-4-2-1. M1EXV

The procedure to configure the I/O of the M1EXV to the following specifications is described here:

Input: Ch1 = 4 to 20 mA DC, Ch 2 = 1 to 5 V DC

Output: Ch1 = 1 to 5 V DC, Ch 2 = 0 to 10 V DC

1) Input

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

- [Input range]

0 – 50 mA

-1000 – +1000 mV

-10 – +10 V

Choose the input range “0 – 50 mA” in the [Ch1 Setting], and “-10 – +10 V” in the [Ch2 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].

Set [0% input setting] to 4.00 and [100% input setting] to 20.00 in the [Ch1 Setting]. Set [0% input setting] to 1.000 and [100% input setting] to 5.000 in the [Ch2 Setting].

2) Output

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

- [Output range]

0 – 20 mA

-5 – +5 V

-10 – +10 V

Choose the output range “-5 – +5 V” in the [Ch1 Setting], and “-10 – +10V in the [Ch2 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].

Set [0% output setting] to 1.000 and [100% output setting] to 5.000 in the [Ch1 Setting]. Set [0% output setting] to 0.000 and [100% output setting] to 10.000 in the [Ch2 Setting].

4-4-2-2. M1EXM

The procedure to configure the I/O of the M1EXM to the following specifications is described here:

Input: Ch 1 = 100 to 600 Ω, Ch 2 = 0 to 500 Ω, using 1 kΩ potentiometer

Output: Ch 1 = 4 to 20 mA DC, Ch 2 = -2.5 to 2.5 V DC

1) Input

Set [0% input setting] to 10.00 and [100% input setting] to 60.00 in the [Ch1 Setting].

Set [0% input setting] to 0 and [100% input setting] to 50.00 in the [Ch2 Setting].

2) Output

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

- Output range]

0 – 20 mA

-5 – +5 V

-10 – +10 V

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

Set [0% output setting] to 4.000 and [100% output setting] to 20.000 in the [Ch1 Setting]. Set [0% output setting] to -2.500 and [100% output setting] to 2.500 in the [Ch2 Setting].

4-4-2-3. M1EXR

The procedure to configure the I/O of the M1EXR to the following specifications is described here:

Input: Ch1 = Pt 100 (JIS '97, IEC) 0 to 100 °C, Ch2 = Pt 50 Ω (JIS '81) 32 to 212 °F

Output: Ch 1 = 1 to 5 V DC, Ch 2 = 0 to 10 V DC

1) Input

Set [Temperature unit] first.

- [Temperature unit]

deg C

deg F

K

Choose the temperature unit “deg C” in the [Ch1 Setting], and “deg F” in the [Ch2 Setting].

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

- [Input range]

JPt 100 (JIS '89)

Pt 100 (JIS '89)

Pt 100 (JIS '97, IEC)

Pt 50 Ω (JIS '81)

Ni 508.4 Ω

Pt 1000

Ni 100

Cu 10 (25°C)

Choose the input range “Pt 100 (JIS '97, IEC)” in the [Ch1 Setting], and “Pt 50 Ω (JIS '81)” in the [Ch2 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].

Set [0% input setting] to 0.0 and [100% input setting] to 100.0 in the [Ch1 Setting]. Set [0% input setting] to 32.0 and [100% input setting] to 212.0 in the [Ch2 Setting].

2) Output

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

- [Output range]

0 – 20 mA

-5 – +5 V

-10 – +10 V

Choose the output range “-5 – +5 V” in the [Ch1 Setting], and “-10 – +10V” in the [Ch2 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].

Set [0% output setting] to 1.000 and [100% output setting] to 5.000 in the [Ch1 Setting]. Set [0% output setting] to 0.000 and [100% output setting] to 10.000 in the [Ch2 Setting].

4-4-2-4. M1EXT

The procedure to configure the I/O of the M1EXT to the following specifications is described here:

Input: Ch1 K (CA) 0 to 1000 °C

Ch2 E (CRC) 273.15 to 773.15 K

Output: Ch1 4 to 20 mA DC, Ch2 1 to 5 V DC

1) Input

Set [Temperature unit] first.

- [Temperature unit]

deg C

deg F

K

Choose the temperature unit “deg C” in the [Ch1 Setting], and “K” in the [Ch2 Setting].

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

- [Input range]

(PR)

K (CA)

E (CRC)

J (IC)

T (CC)

B (RH)

R

S

C (WRe 5-26)

N

U

L

P (Platinel II)

Choose the input range “K (CA)” in the [Ch1 Setting], and “E (CRC)” in the [Ch2 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].

Set [0% input setting] to 0.0 and [100% input setting] to 1000.0 in the [Ch1 Setting]. Set [0% input setting] to 273.15 and [100% input setting] to 773.15 in the [Ch2 Setting].

2) Output

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

- [Output range]

0 – 20 mA

-5 – +5 V

-10 – +10 V

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

Set [0% output setting] to 4.000 and [100% output setting] to 20.000 in the [Ch1 Setting]. Set [0% output setting] to 1.000 and [100% output setting] to 5.000 in the [Ch2 Setting].

4-4-2-5. M1EXS

The procedure to configure the I/O of the M1EXS to the following specifications is described here:

Input: Ch1 0 to 270°, Ch2 180 to 90°

Output: Ch1 0 to 10 V DC, Ch2 0 to 5 V DC

1) Input range

Set [Angle offset] to 0.00 and [Angle span] to 270.00 in the [Ch1 Setting], and [Angle offset] to 180.00 and [Angle span] to 270.00 in the [Ch2 Setting].

2) Output

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

- [Output range]

0 – 20 mA

-5 – +5 V

-10 – +10 V

Choose the output range “-10 – +10 V” in the [Ch1 Setting], and “-5 – +5V” in the [Ch2 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].

Set [0% output setting] to 0.000 and [100% output setting] to 10.000 in the [Ch1 Setting]. Set [0% output setting] to 0.000 and [100% output setting] to 5.000 in the [Ch2 Setting].

4-4-3. OTHER SETTINGS

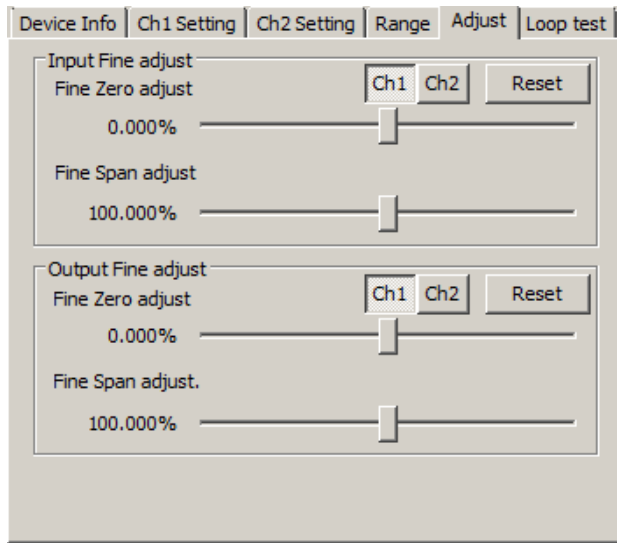
Edit other setting parameters in the [File Configuration]. Read the parameters with [Upload] from the device, edit them, and write them to the device with [Download].

Model specific setting parameter items and ranges are explained in “8. PARAMETER DETAILS” on page 21.

5. ADJUST - FINE ADJUSTMENTS

Fine adjustments can be conducted independently for the input and the output. Fine Zero adjust is the offset adjustment, while Fine Span adjust is the gain adjustment.

Click [Ch1] or [Ch2] button to select a channel. Drag each slider left or right to adjust. Click either side of the sliders or use arrow keys to apply minimum step adjustments.



Perform Input Fine Adjustment while monitoring the input indicated on the display of the device or in the upper part in the [Device Configuration] frame of the M1ECFG. 1) Apply the value you want to set to input value 0%. 2) Adjust the sliding potentiometer until the monitored input signal shows 0% input. 3) Apply the value you want to set to input value 100%. 4) Adjust the sliding potentiometer until the monitored input signal shows 100% input.

For Output Fine Adjustment, perform Fine Zero adjustment or Fine Span adjustment while monitoring the output with a measuring instrument such like digital multi-meter, and match each output. When the device outputs 0%, adjust Output Fine Zero Adjustment, and when the device outputs 100%, adjust Output Fine Span Adjustment.

To reset the Input or Output Fine Adjustments to the ex-factory state, click each [Reset] button.

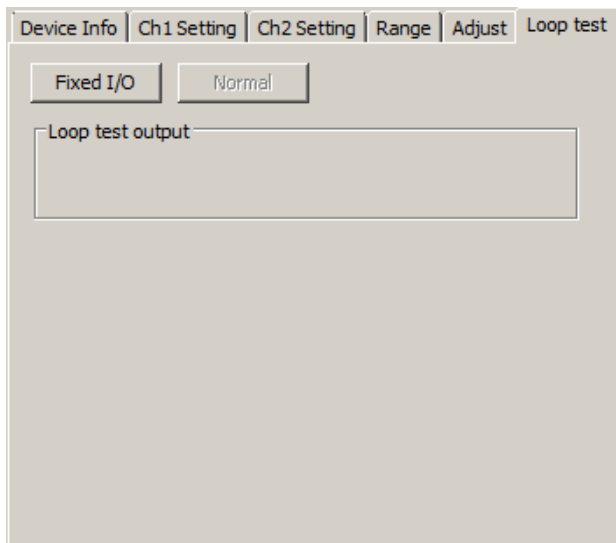
NOTE: The Input Fine Adjustment is not available with **M** and **S**.

6. LOOP TEST

(This is available only when [Editing] box is unchecked)

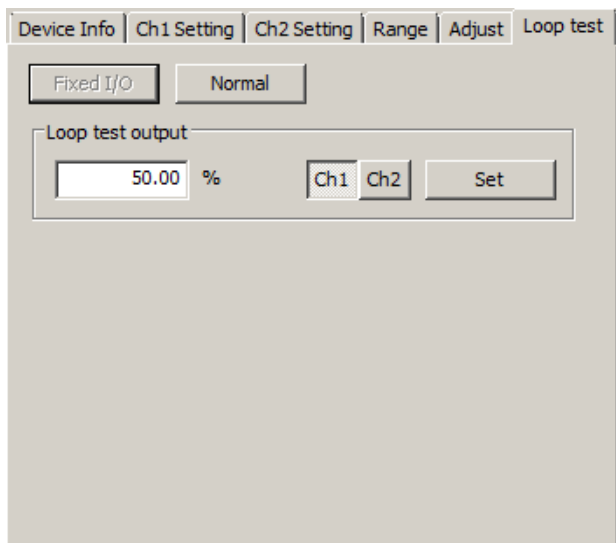
The device output signal can be simulated without actual input signals to conduct a loop test.

- 1) Click [Fixed I/O] button. The output signal is fixed according to present input, and even when the input varies, the output remains fixed. The output signal can be changed as shown below.



- 2) Click [Ch1] or [Ch2] button to select a channel.

Enter a desired output value in the text box and click Enter key or [Set] button. The output will be fixed with the entered value.



SYMBOL	SIMULATED OUTPUT RANGE
V M S	-5.00 to +105.00 %
R T	-10.00 to +110.00 %

- 3) Click [Normal] button to cancel the loop test mode.

Note 1: If the communication or the configurator cable is disconnected from the connected device during Fixed I/O, the device Fixed I/O will be disabled after a certain time.

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

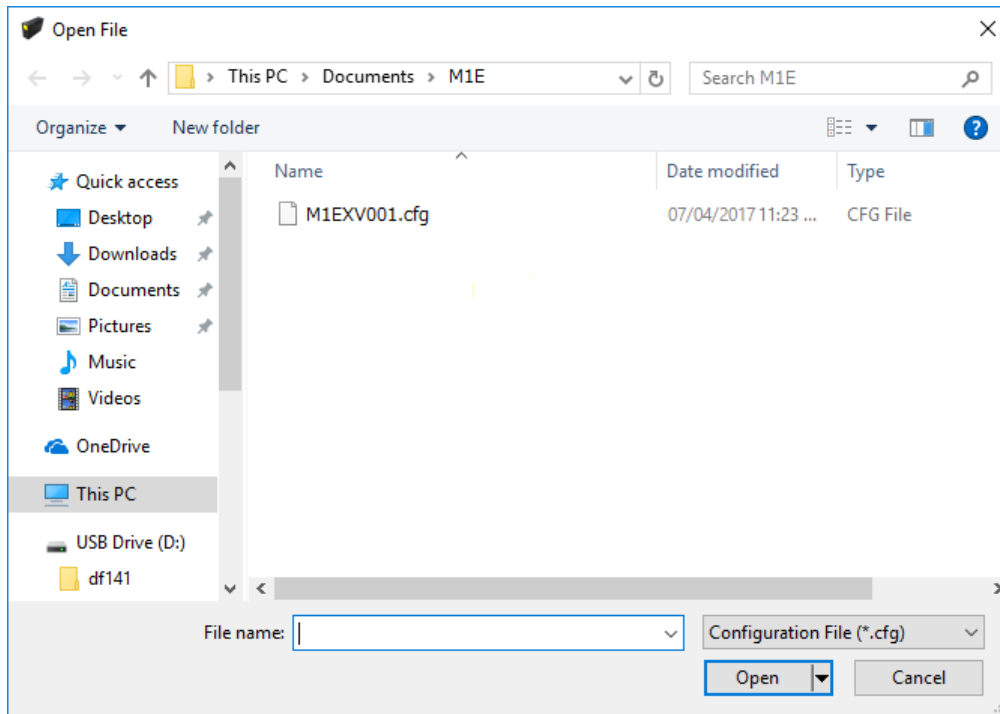
Note 3: DO NOT perform the loop test with the M1ECFG and the front button operation of the device at the same time.

7. READING / SAVING FILES

The setting parameters edited in the [File Configuration] can be saved as a file. You can write the same settings to other devices easily.

7-1. READING SETTING PARAMETERS SAVED AS FILE

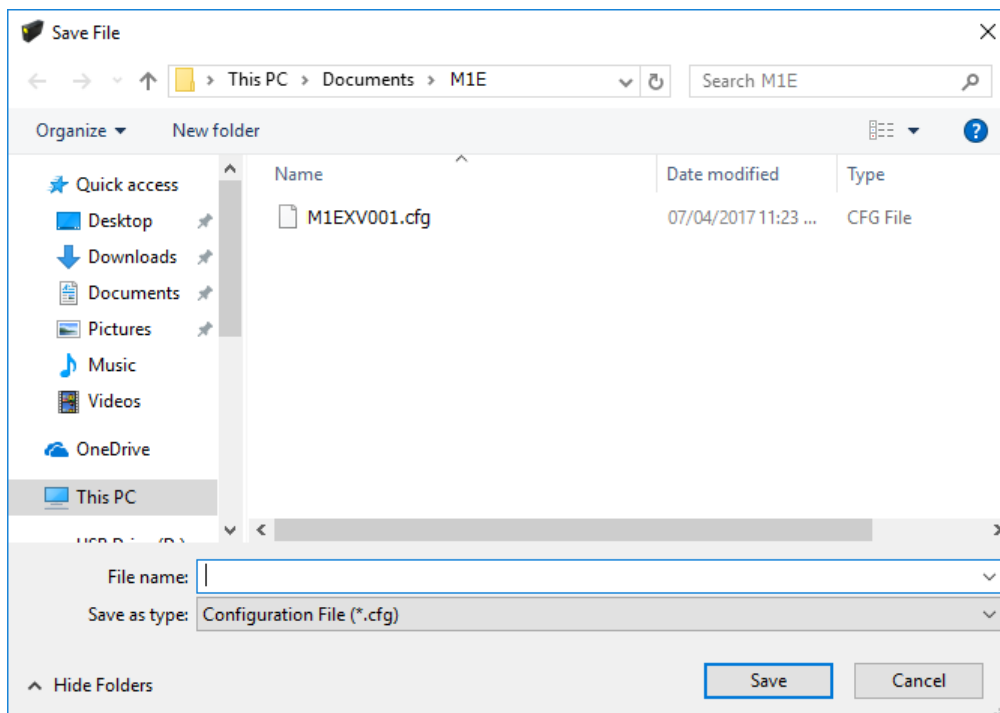
Clicking [Open File] calls up the Windows-standard Open dialog box.



Select a parameter file to show a stored parameter setting in the [File Configuration] frame. In order to download 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.



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

Note: Do not overwrite the saved files with a text editor, otherwise errors may occur in reading.

8. PARAMETER DETAILS

8-1. PARAMETER LIST

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

		M1EXV	M1EXM	M1EXR	M1EXT	M1EXS	Page
Ch1 / Ch2 Setting	Temperature unit			✓	✓		21
	Input range	✓		✓	✓		22
	0% input setting / 100% input setting	✓	✓	✓	✓		22
	Angle offset / Angle span					✓	23
	Rotating direction					✓	23
	0% input scaling / 100% input scaling	✓	✓			✓	23
	Input scaling decimal point	✓	✓			✓	23
	Input decimal point			✓	✓		23
	Unit (INP scaling)	✓	✓			✓	23
	User unit setting	✓	✓			✓	23
	Burnout			✓	✓		23
	Sensor wires			✓			23
	Wire resistance			✓			24
	Cold junction compensation				✓		24
	Terminal temperature				✓		24
	Output range	✓	✓	✓	✓	✓	24
	0% output setting / 100% output setting	✓	✓	✓	✓	✓	24
	Overrange output < 0% / Overrange output > 100%					✓	24
	Filter time constant	✓	✓	✓	✓	✓	24
	Input Zero fine adjust / Input Span fine adjust	✓		✓	✓		25
Output Zero fine adjust / Output Span fine adjust	✓	✓	✓	✓	✓	25	
Advanced	Upper display setting	✓	✓	✓	✓	✓	25
	Lower display setting	✓	✓	✓	✓	✓	26
	Channel enable	✓	✓	✓	✓	✓	26
	Brightness	✓	✓	✓	✓	✓	26
	Display timeout	✓	✓	✓	✓	✓	26
Ch1 / Ch2 Linearizer	User's table linearization	✓	✓			✓	27
	Number of points	✓	✓			✓	27
	Table	✓	✓			✓	28

8-2. CH1 SETTING / CH2 SETTING

8-2-1. TEMPERATURE UNIT

Select the temperature unit for [0% input setting], [100% input setting], [Input Zero fine adjust] and [Input Span fine adjust] from the following:

- _____
- deg C
- _____
- deg F
- _____
- K

deg C = Celsius (°C), deg F = Fahrenheit (°F)

Note 1: After setting temperature unit of a channel, [0% input setting], [100% input setting], [Wire resistance] (for only), [Preset fixed terminal temperature] (for only), [Input Zero fine adjust] and [Input Span fine adjust] of the channel turn to initial values.

8-2-2. INPUT RANGE V R T

Select input range of the device from the following table:

SYMBOL	INPUT RANGE
V	0 – 50 mA -1000 – +1000 mV -10 – +10 V
R	JPt 100 (JIS '89) Pt 100 (JIS '89) Pt 100 (JIS '97, IEC) Pt 50 Ω (JIS '81) Ni 508.4 Ω Pt 1000 Ni 100 Cu 10 (25 deg C)
T	(PR) K (CA) E (CRC) J (IC) T (CC) B (RH) R S C (WRe 5-26) N U L P (Platinel II)

Note: After setting input range of a channel, [0% input setting], [100% input setting], [Wire resistance] (for R only), [Preset fixed terminal temperature] (for T only), [Input Zero fine adjust] and [Input Span fine adjust] of the channel turn to initial values.

8-2-3. 0% INPUT SETTING / 100% INPUT SETTING V M R T

0% and 100% input signals can be configured within the setting range. For example, with V, when the input signal is 1 – 5 V DC with the [Input range] -10 – +10 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
V	0 – 50 mA	0.00 – 50.00	2.00
	-1000 – +1000 mV	-1000.0 – 1000.0	100.0
	-10 – +10 V	-10.000 – 10.000	1.000
M	–	0.00 – 105.00	5.00
R	JPt 100 (JIS '89)	-200.00 – +500.00 (°C)	20.00 (°C)
	Pt 100 (JIS '89)	-200.00 – +650.00 (°C)	
	Pt 100 (JIS '97, IEC)	-200.00 – +850.00 (°C)	
	Pt 50 Ω (JIS '81)	-200.00 – +649.00 (°C)	
	Ni 508.4 Ω	-50.00 – +200.00 (°C)	
	Pt 1000	-200.00 – +850.00 (°C)	
	Ni 100	-50.00 – +200.00 (°C)	
	Cu 10 @ 25°C	-50.00 – +250.00 (°C)	
T	(PR)	0.00 – 1760.00 (°C)	20.00 (°C)
	K (CA)	-270.00 – +1370.00 (°C)	
	E (CRC)	-270.00 – +1000.00 (°C)	
	J (IC)	-210.00 – +1200.00 (°C)	
	T (CC)	-270.00 – +400.00 (°C)	
	B (RH)	0.00 – 1820.00 (°C)	
	R	-50.00 – +1760.00 (°C)	
	S	-50.00 – +1760.00 (°C)	
	C (WRe 5-26)	0.00 – +2315.00 (°C)	
	N	-270.00 – +1300.00 (°C)	
	U	-200.00 – +600.00 (°C)	
	L	-200.00 – +900.00 (°C)	
	P (Platinel II)	0.00 – 1395.00 (°C)	

8-2-4. ANGLE OFFSET / ANGLE SPAN S

Set the angle offset and span for the input signal. For example, set [Angle offset] to 50.00 and [Angle span] to 100.00, and 50.00 to 150.00° input will be scaled to 0% to 100%.

	SETTING RANGE
Angle offset	0.00 – 359.99°
Angle span	60.00 – 359.99°

8-2-5. ROTATING DIRECTION S

Set the rotating direction of the self-synchronizing motor from the following:

- CW (clockwise)
- CCW (counter-clockwise)

8-2-6. 0% INPUT SCALING / 100% INPUT SCALING V M S

Scaling values for [0% input setting] and [100% input setting] can be configured.

For example, with V, when you set [input range] 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.

8-2-7. INPUT SCALING DECIMAL POINT V M S

Set decimal point position for [Input scaling] among no decimal point to 5 places of decimals.

8-2-8. INPUT DECIMAL POINT R T

Set decimal point position for [0% input setting] and [100% input setting] among no decimal point to 2 places of decimals.

8-2-9. UNIT (INP SCALING) V M S

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

DC, AC, mV, V, kV, μ A, mA, A, kA, mW, W, kW, var, kvar, Mvar, VA, Hz, Ω , k Ω , M Ω , cm, mm, m, m/sec, mm/min, cm/min, m/min, m/h, m/s², inch, L, L/s, L/min, L/h, m³, m³/sec, m³/min, m³/h, Nm³/h, N·m, N/m², g, kg, kg/h, N, kN, Pa, kPa, MPa, t, t/h, °C, °F, K, %RH, J, kJ, MJ, rpm, sec, min, min⁻¹, pH, %, ppm, deg, (blank), User

8-2-10. USER UNIT V M S

Set your desired unit using characters shown below when User is selected in [Unit (INP scaling)]. Up to 13 characters can be configured.

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

8-2-11. BURNOUT R T

Select the operation at burnout from the following:

- None
- Down
- Up

When the device detects disconnection of a temperature sensor, it can output 110% with upscale burnout (error message "BURNOUT ERROR U") or -10% with downscale (error message "BURNOUT ERROR D").

Or setting not to detect the disconnection is also available. The error message "OVER RANGE D" or "OVER RANGE U" is indicated with disconnection of the sensor.

Refer to "3. DEVICE INFO - DEVICE INFORMATION" on page 7 for detailed error messages.

8-2-12. SENSOR WIRES R

Set number of sensor wires for RTD from the following:

- 2 wires
- 3 wires

8-2-13. WIRE RESISTANCE R

Compensate the wire resistance. The setting range depends on the input range.
Configurable only with 2 wires selected for the [Sensor wires].

INPUT RANGE	SETTING RANGE
JPt 100 (JIS '89)	0.000 – 50.000 (Ohm)
Pt 100 (JIS '89)	0.000 – 50.000 (Ohm)
Pt 100 (JIS '97, IEC)	0.000 – 50.000 (Ohm)
Pt 50 Ω (JIS '81)	0.000 – 50.000 (Ohm)
Ni 508.4 Ω	0.000 – 50.000 (Ohm)
Pt 1000	0.000 – 50.000 (Ohm)
Ni 100	0.000 – 50.000 (Ohm)
Cu 10 @ 25°C	0.000 – 20.000 (Ohm)

8-2-14. COLD JUNCTION COMPENSATION T

Select the cold junction compensation (CJC) method from the following:

CJM
FXD TEMP

With CJM, the thermal electromotive force is compensated using the supplied CJC Sensor (model: CJM).
With FXD TEMP, the thermal electromotive force at the temperature set with the [Terminal temperature] is compensated.
(Error may be increased due to the preset fixed terminal temperature different from the actual terminal temperature.)

8-2-15. TERMINAL TEMPERATURE T

Set the terminal temperature for the cold junction compensation within the range of -50.00 to 100.00°C. Configurable only with FXD TEMP selected for the [Cold junction compensation].

8-2-16. OUTPUT RANGE

Device output specification can be configured. Can be selected from the following:

0 – 20 mA
-5 – +5 V
10 – +10 V

Note 1: After setting output range of a channel, [0% output setting], [100% output setting], [Output Zero fine adjust] and [Output Span fine adjust] of the channel turn to initial values.

8-2-17. 0% OUTPUT SETTING / 100% OUTPUT SETTING

0% and 100% Output signals can be configured within the setting 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
0 – 20 mA	0.000 – 20.000	1.000
-5 – +5 V	-5.000 – 5.000	0.250
-10 – +10 V	-10.000 – 10.000	1.000

8-2-18. OVERRANGE OUTPUT < 0% / OVERRANGE OUTPUT > 100% S

Set the overrange output range when input < 0% or > 100%.

	SETTING RANGE
Output range < 0%	-5.00 – 0.00%
Output range > 100%	100.00 – 105.00%

8-2-19. FILTER TIME CONSTANT

First order lag filter with the specified time constant can be used. No filter is applied when set to 0. Set the time constant to 0, or within the range of 1 to 30 seconds.

First order lag filter is equivalent to ordinary CR filters and the time constant is the time the output reaches approx. 63% of the full-scale with step input change from 0% to 100%.

8-2-20.INPUT ZERO FINE ADJUST / INPUT SPAN FINE ADJUST V R T

Input engineering unit value can be adjusted.

The adjustable ranges of the [Input Zero fine adjust] and [Input Span fine adjust] depend on the models as shown in the following table:

SYMBOL	ADJUSTABLE RANGE	
	INPUT ZERO FINE ADJUST	INPUT SPAN FINE ADJUST
V	-5.000 – +5.000%	95.000 – 105.000%
R T	-10.00 – +10.00°C	-10.00 – +10.00°C

8-2-21.OUTPUT ZERO FINE ADJUST / OUTPUT SPAN FINE ADJUST

Output engineering unit value can be adjusted.

[Output Zero fine adjust] can be set between -5.000 – +5.000 (%) and [Output Span fine adjust] can be set between 95.000 – 105.000 (%).

8-3.ADVANCE - ADVANCED SETTING

8-3-1. UPPER DISPLAY SETTING

Information to be displayed on the upper device display while the device is in the measuring mode can be configured from the following table:

SYMBOL	UPPER DISPLAY SETTING
V M S	Ch1 INPUT Ch1 INPUT (Scaling) Ch1 PERCENT (*) Ch1 OUTPUT Ch2 INPUT Ch2 INPUT (Scaling) Ch2 PERCENT (*) Ch2 OUTPUT
R	Ch1 INPUT Ch1 RESISTANCE Ch1 PERCENT (*) Ch1 OUTPUT Ch2 INPUT Ch2 RESISTANCE Ch2 PERCENT (*) Ch2 OUTPUT
T	Ch1 INPUT Ch1 ELECTROMOTIVE FORCE Ch1 PERCENT (*) Ch1 OUTPUT Ch2 INPUT Ch2 ELECTROMOTIVE FORCE Ch2 PERCENT (*) Ch2 OUTPUT

(*) Percent value for input.

8-3-2. LOWER DISPLAY SETTING

Information to be displayed on the lower device display while the device is in the measuring mode can be configured from the following table:

SYMBOL	LOWER DISPLAY SETTING
V M S	Ch1 INPUT Ch1 INPUT (Scaling) Ch1 PERCENT (*) Ch1 OUTPUT Ch2 INPUT Ch2 INPUT (Scaling) Ch2 PERCENT (*) Ch2 OUTPUT None
R	Ch1 INPUT Ch1 RESISTANCE Ch1 PERCENT (*) Ch1 OUTPUT Ch2 INPUT Ch2 RESISTANCE Ch2 PERCENT (*) Ch2 OUTPUT None
T	Ch1 INPUT Ch1 ELECTROMOTIVE FORCE Ch1 PERCENT (*) Ch1 OUTPUT Ch2 INPUT Ch2 ELECTROMOTIVE FORCE Ch2 PERCENT (*) Ch2 OUTPUT None

(*) Percent value for input.

8-3-3. CHANNEL ENABLE

Whether to enable the channels 1 and 2 can be configured from the following table:

Ch1 enable/ch2 enable
Ch1 enable/ch2 disable
Ch1 disable/ch2 enable

Note 1: A disabled channel configuration is available.

8-3-4. BRIGHTNESS

Adjust display brightness of the device within the range of 1 (dark) to 4 (bright).

8-3-5. DISPLAY TIMEOUT

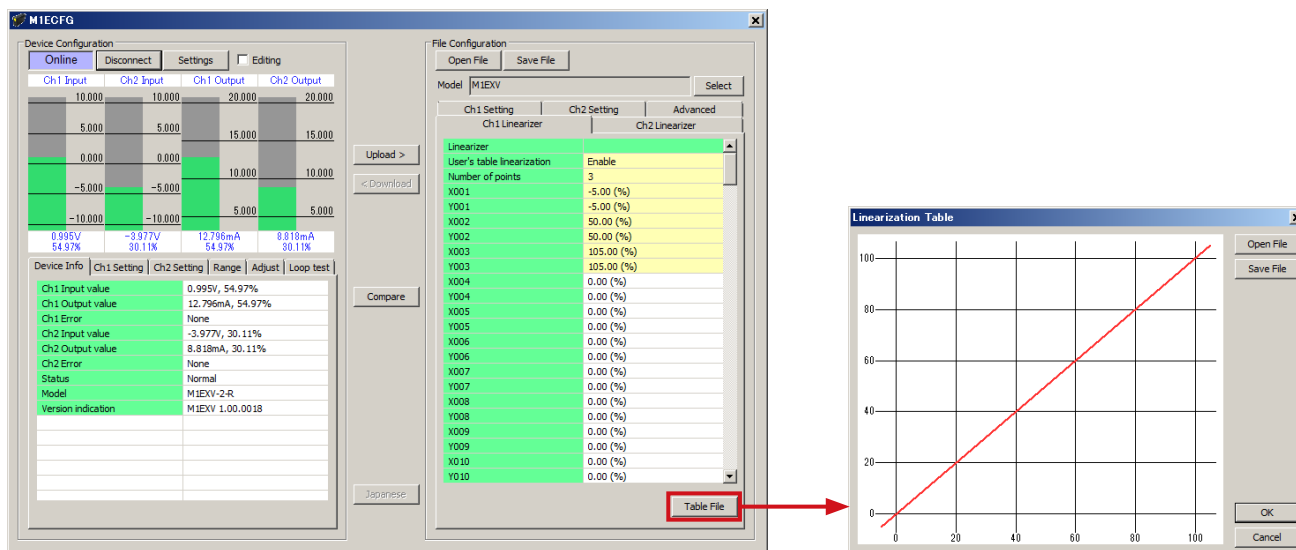
Specify how much idle time must elapse before the display is turned off among 0, or 1 to 60 minutes. The display remains on indefinitely if set to 0.

8-4. LINEARIZER – LINEARIZATION SETTING V M S

In the [Ch1 Linearizer] and [Ch2 Linearizer] tabs, multiple sets of input (X) and output (Y) values can be specified to convert I/O with calibration points.

A user-specified linearization table in the tabs can be saved as a table file, while saved table files can be also imported. Click [Table File] button to read or save a file.

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



Click [Table File] to display the screen shown upper right.

Click [Open File] or [Save File] button to read or save a table file. Refer to "9. APPENDIX" on page 28 for detailed table format.

8-4-1. USER'S TABLE LINEARIZATION V M S

Whether to enable linearization with a user defined table can be configured.

- Disable
- Enable

With [Disable] selected, conversion with a user specified table is set to off.

With [Enable] selected, the input is converted into the output according to a user specified table.

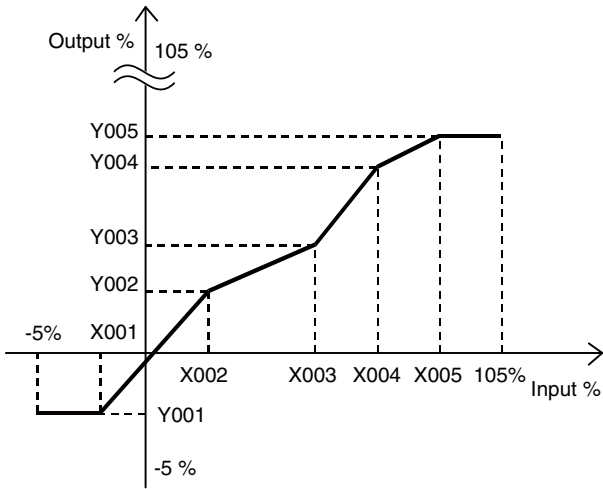
8-4-2. NUMBER OF POINTS V M S

Specify the number of calibration points in the linearization table. Adjustable setting range is 2 to 111. When table file is read, it is automatically updated according to available number of Xn, Yn pair.

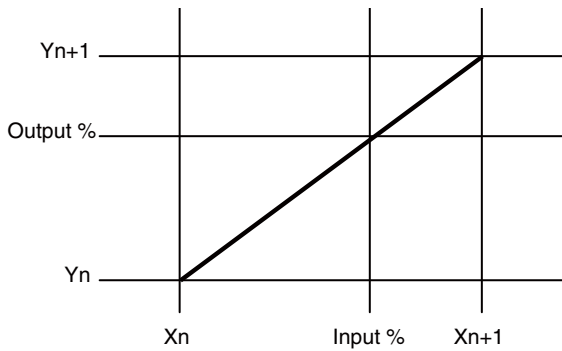
8-4-3. TABLE V M S

Specify a user specified table used for conversion. Both X and Y adjustable range is -5 to +105 (%). Arrange in order from the smallest X value starting from X001. If you set in different order, precise conversion cannot be achieved.

In the conversion using a user specified table, an input is searched from the table containing pairs of X = input (unit %) and Y = output (unit %), and the corresponding Y is output.



When an input value X is not set in the table, two closest calibration points are selected and interpolated linearly to output Y.



When an input value is out of the defined range, the closest Y value is applied.

9. APPENDIX

9-1. USER TABLE FORMAT V M S

The following indicates user specified table file format used in this software.

User specified table data used in [Ch1 Linearizer] and [Ch2 Linearizer] is saved in a text format file as shown below:

```
/* 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 row contains only ‘{’ or ‘}’.

Each row contains Xn and Yn represented in %, paired and separated by comma within the range of -5.00 to +105.00% (two decimal places). Data must be arranged in order from the smallest Xn.

Max. 111 pairs of ‘Xn, Yn’ can be described.

The row starting with ‘/’ is recognized as a comment.

A table file must be saved with extension “txt”.