Model M2LV SIGNAL TRANSMITTER

PC CONFIGURATOR SOFTWARE

Model: M2LVCFG

Users Manual

MG CO., LTD. www.mgco.jp
5-2-55 Minamitsumori, Nishinari-ku, Osaka 557-0063 JAPAN

CONTENTS

1. INTRODUCTION

1.1 GENERAL DESCRIPTION

The M2LVCFG is used to program parameters for model M2LV Signal Transmitter (referred hereunder as 'device'). The following major functions are available:

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

1.2 PC REQUIREMENTS

The following PC performance is required for adequate operation of the M2LVCFG.

PC	IBM PC compatible
OS	Windows 7 (32bit, 64bit), Windows 10 (32bit, 64bit) The software may not operate adequately in certain conditions.
Network port	COM port (RS-232-C) or USB port

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

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

1.3 INSTALLING & UNINSTALLING THE PROGRAM

INSTALL

The program is provided as compressed archive. Decompress the archive and execute 'setup.exe' to start up the M2LVCFG installer program. Follow instructions on the Windows.

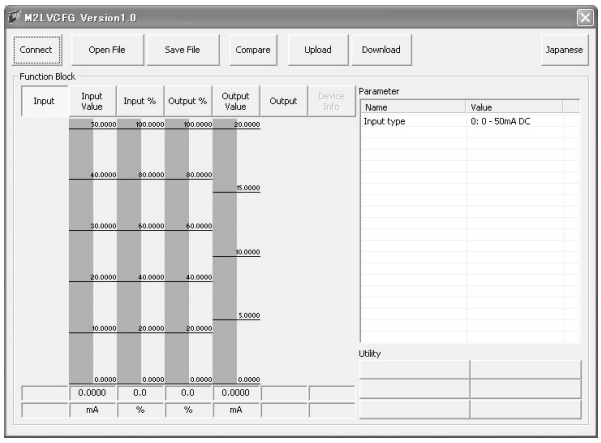
UNINSTALL

Open Control Panel > Add/Remove Programs. Select the M2LVCFG from the program list and click Delete button.

2. GETTING STARTED

2.1 STARTING THE M2LVCFG

Open Program > M-System > Configurator > M2LV to start up the M2LVCFG on the Windows PC. The following appears on the screen.



2.2 OPERATING MODES

Two operating modes are available when using the M2LVCFG: Online mode and Offline mode.

In the online mode, the M2LVCFG is connected to the device. Parameters can be edited while monitoring the device operation. New parameters are applied to the device at once.

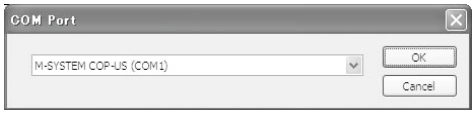
In the offline mode, the M2LVCFG is not connected to the device. New parameter setting can be created, saved as files to be downloaded later. You can also open such files or upload from the device to edit and then download to the device again.

CONNECTING / DISCONNECTING THE DEVICE

The program's initial state is in offline mode.

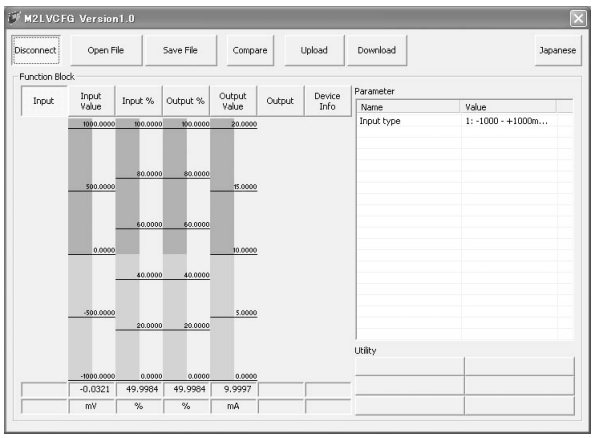
1) Connect the device to the PC's COM port with the PC Configurator Cable and click [Connect] button at the left top of the screen.

2) Choose the COM port number to which the device is connected, and click [OK].



3) The device's present parameters are uploaded and shown on the screen.

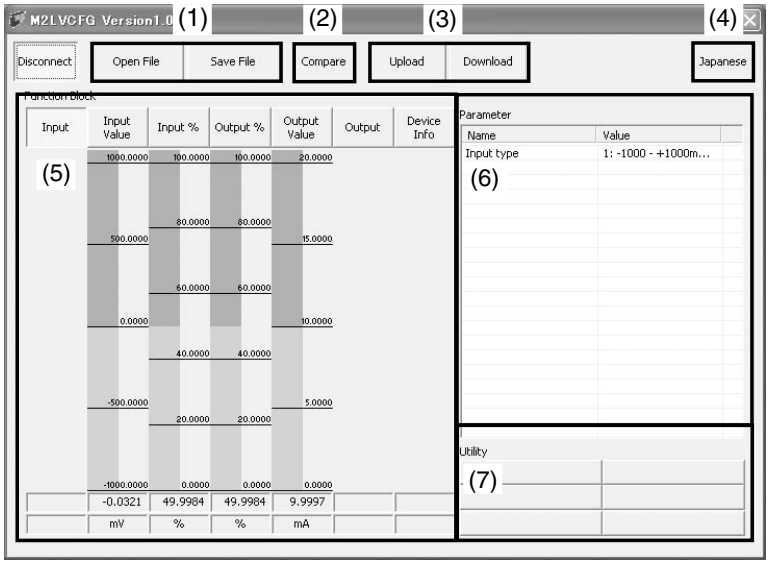
[Connect] button is now replaced with [Disconnect] button, the bargraphs on the screen show real time I/O status of the device.



In order to go back to the offline mode, click [Disconnect] button.

2.3 BASIC OPERATIONS

2.3.1 SCREEN COMPONENT IDENTIFICATION



(1) Open File / Save File

These buttons are used to read a parameter setting saved in files and to save edited ones as files.

(2) Compare

This button is used to compare edited parameters from actual setting. Clicking [Compare] button shows two sets of parameters: one presently edited on the screen and another uploaded from the connected device.

(3) Upload / Download

These buttons are used to read parameter setting in the device and to write one to the device.

(4) English / Japanese

This button is used 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.

(5) Function Block

These buttons are used to choose Function Block and show parameters selectable in each block.

In online mode, the bargraphs below Function Block buttons show in real time conversion results at each block from Input to Output.

(6) Parameter

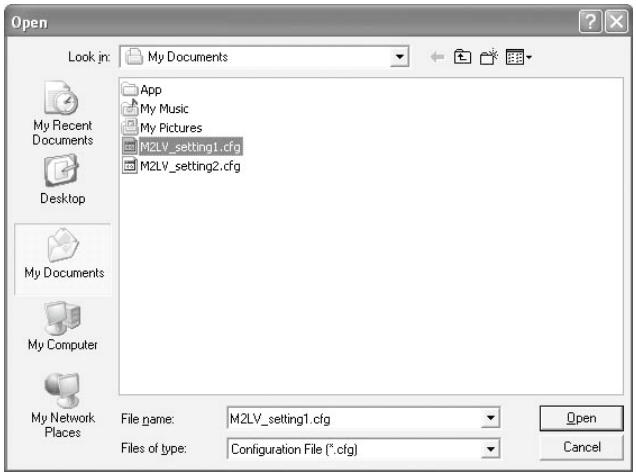
Shows all available parameters in the selected Function Block. Click Value cell to change. In online mode, new parameters are applied to the device immediately.

(7) Utility

Shows all available utility buttons in the selected Function Block.

2.3.2 READING PARAMETERS SAVED AS FILE

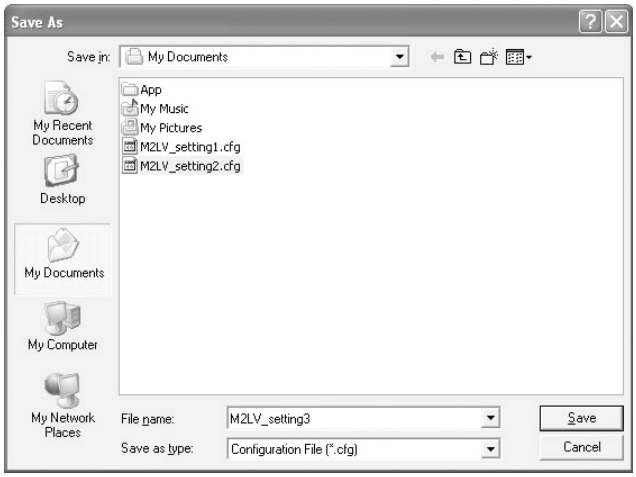
Clicking [Open File] calls up the Windows-standard Open dialog box. Select a parameter file to show a stored parameter setting.



In online mode, the parameters are automatically downloaded at the same time to the connected device.

2.3.3 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 a parameter setting.



2.3.4 READING PARAMETERS FROM DEVICE (UPLOAD)

Clicking [Upload] starts reading parameters stored in the connected device to show them on the screen. Specify the COM port of the device and click [OK].

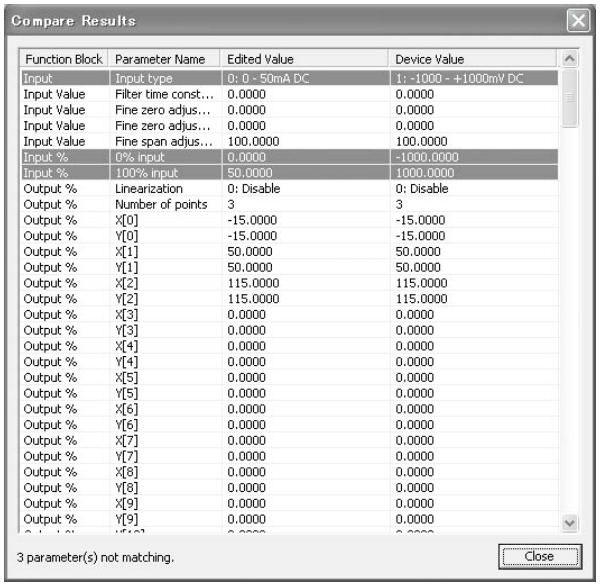
2.3.5 WRITING PARAMETERS TO DEVICE (DOWNLOAD)

Clicking [Download] starts writing parameters edited on the screen to the connected device. Specify the COM port of the device and click [OK].

2.3.6 COMPARING PARAMETERS

Parameters presently edited on the screen and those stored in the connected device can be compared side by side. Edited parameters could be from a file if you open one in advance, or another device if you upload one in advance.

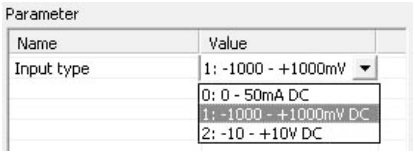
Clicking [Compare] button starts reading parameters from the connected device. Parameters are compared and listed on the screen side by side. The rows showing differences between two sets of parameters are highlighted in red background. The total number of non-matching cases is mentioned at the bottom.



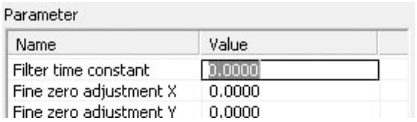
2.3.7 CHANGING PARAMETERS

Choose a Function Block to show all available parameters in the list to the right. Click Value cell to change.

For example, when you want to change input type, choose Input function block and click Value cell for Input Type parameter. Then an arrow appears to show you the pulled-down menu list. Choose one from the list.



Another example is to change the input filter's time constant. Choose Input Value function block and click Value cell for Filter Time Constant. Then an edit box appears in the cell. Enter a desired value and press Enter key on the keyboard.



2.3.8 UTILITY

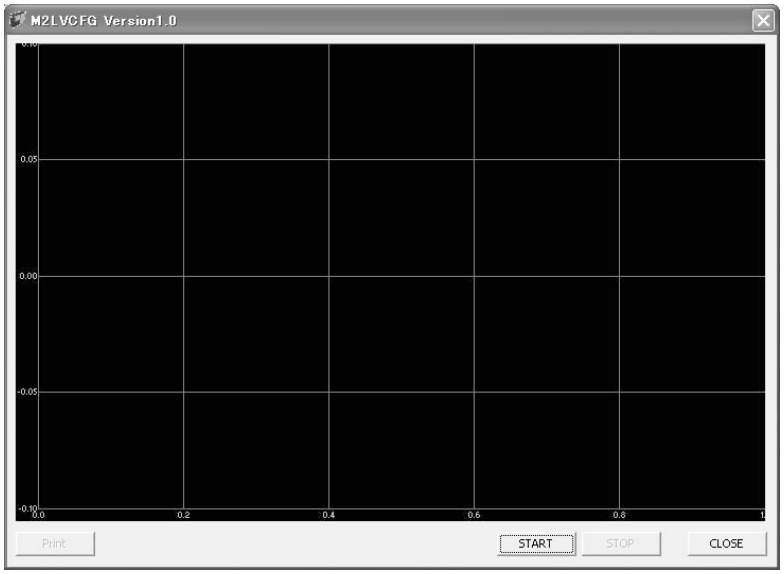
Utility functions are available to help changing parameters and to monitor the device operation on a trend graph.

Choose a Function Block to show all available Utility functions.

Some utility functions affect the device operation immediately, others call up dialog boxes to interface with the user. For detailed explanations, please refer to Section 4. FUNCTION BLOCKS.

2.3.9 TREND GRAPH

Function Blocks which are used to convert one value to another such as Input Value have Trend Graph function. The trend is recorded and displayed in 0.5 second intervals.



Click [Start] to start recording and displaying in real time.

Click [Stop] to stop monitoring, and the recorded trend graph can be studied more closely by scrolling and enlarging the screen:

Mouse	**Screen**
Press left mouse button and drag	Scrolls the screen to all directions.
Press right mouse button and drag	Forms an area on the screen to enlarge and fit it to the full-screen area when the mouse button is released.
Double-click left mouse button	Display range is reduced by half (trend curve is zoomed in).
Double-click right mouse button	Display range is doubled (trend curve is zoomed out).

[Print] is available only when the monitoring is stopped by [Stop] button.

Click [Print] to print the trend graph presently displayed on the screen.

3. HOW TO SETUP I/O (EXAMPLE)

Basic setup procedure including the input/output range setting and the fine output zero/span adjustments is as in the following.

The input and output ranges are to be configured to 1 to 5 V DC in the below example.

3.1 INPUT / OUTPUT RANGES

3.1.1 DIP SWITCH SETTING

Before turning on the power supply to the device, set the DIP switches on the device side.

Set SW2-8 to ON in order to turn the device into PC Configuration Mode.

MODE	SW2-8	
DIP SW	OFF	
PC	ON	<< Set SW2-8 to ON.

The output type must be selected according to the table below. There is no need of selecting the input type with DIP switches.

OUTPUT	SW1-4	SW1-3	SW1-2	SW1-1
0 – 20 mA	OFF	ON	OFF	OFF
-2.5 – +2.5 V	ON	OFF	OFF	ON
-10 – +10 V	ON	OFF	ON	OFF

For 1-5 V DC output, set the output type to -10 – +10 V.

Connect the device to the PC's COM port with the PC Configurator Cable and turn on the power supply to the device.

3.1.2 UPLOADING SETTING FROM THE DEVICE

Start up the M2LVCFG software and click [Upload] button. Choose the COM port to which the device is connected and click [OK]. Present parameter setting is uploaded and displayed on the screen. Now you can change the parameters.

3.1.3 INPUT RANGE

Click [Input] Function Block. Choose an input type adequate for the desired range from the list below.

0 : 0 – 50 mA DC
1 : -1000 – +1000 mV DC
2 : -10 – +10 V DC

For 1 – 5 V DC input, choose the input type '2 : -10 – +10 V DC'.

Then click [Input %] Function Block. The input range is automatically set to the full-scale of the selected input type. Enter the scaled 0% and 100% range values. Use the same engineering unit as for the type.

For 1-5 V DC input, set 1.000 to '0% input' and 5.000 to '100% input.'

3.1.4 OUTPUT RANGE

Click [Output] Function Block. Choose an output type adequate for the desired range from the list below.

0 : 0 – 20 mA DC
1 : -2.5 – +2.5 V DC
2 : -10 – +10 V DC

For 1-5 V DC input, choose the input type '2 : -10 – +10 V DC.'

Then click [Output Value] Function Block. The output range is automatically set to the full-scale of the selected output type. Enter the scaled 0% and 100% range values. Use the same engineering unit as for the type.

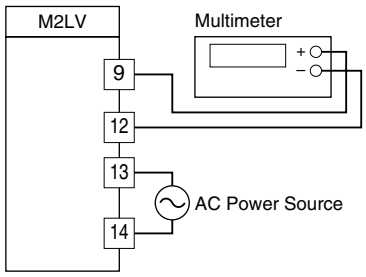
For 1-5 V DC output, set 1.000 to '0% output' and 5.000 to '100% output.'

3.1.5 DOWNLOADING SETTING TO THE DEVICE

Click [Download] button. The new parameter setting edited on the screen is downloaded to the device.

3.2 FINE OUTPUT ZERO / SPAN ADJUSTMENTS

A multimeter of adequate accuracy level is required for reference of the fine adjustments. Connect the meter to the output terminals of the device and turn on its power supply.



3.2.1 ZERO ADJUSTMENT

Click [Output] Function Block and choose 'Fine zero adjustment.'

The device supplies a simulated signal equivalent to 0% output to the meter. Enter the value measured at the meter to 'Fine zero adjustment' field.

For example, when the meter shows 1.005 V, enter 1.005.

3.2.2 SPAN ADJUSTMENT

(Click [Output] Function Block and) choose 'Fine span adjustment.'

The device supplies a simulated signal equivalent to 100% output to the meter. Enter the value measured at the meter to 'Fine span adjustment' field.

For example, when the meter shows 4.996 V, enter 4.996.

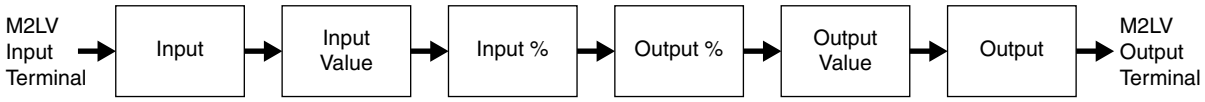
3.3 OTHER SETTING

The device has more variety of functions than explained in the previous sections, including filter time constant setting and linearizations. Basic procedure is mostly the same as the above example. For detailed explanations, please refer to Section 4. FUNCTION BLOCKS.

4. FUNCTION BLOCKS

4.1 GENERAL DESCRIPTIONS

The device performs several internal conversion processes before supplying the output signals. Each conversion process is called 'Function Block.' The device has six Function Blocks to perform six conversions from input to output.



Each block is connected in series from input to output. DC voltage/current supplied at the input terminals is provided to Input Function Block, converted and transferred from block to block in turn, and supplied to the output terminals at Output Function Block.

Each block stores its particular conversion results. User can visually confirm each block's conversion function by referring to these results. For example, Input Value Function Block stores actual engineering unit value (V or mA).

Parameters listed to right side of the screen affect the conversion results, i.e. the device's conversion characteristics can be changed by setting up these parameters.

Basic functions of each Function Block are listed as below:

(1) Input

Determines input signal type at the external terminals. This block converts the input voltage/current into the internal digital data. Choose DC current or voltage (narrow span/wide span) in this block.

(2) Input Value

Converts the digital data into the input data representing voltage/current values. Fine input adjustment including filter is applied in this block.

(3) Input %

Scales the input data to 0 to 100% range. Choose actual device's input range (e.g.. 1 to 5 V DC) in this block.

(4) Output %

Determines either proportional or linearized conversion between input and output. Linearization table is described and applied in this block.

(5) Output Value

Converts the output % data into a DC voltage/current output data. Choose actual device's output range (e.g. 4 to 20 mA DC) in this block.

(6) Output

Determines output signal type at the external terminals. This block converts the internal digital data into the output voltage/current. Choose DC current or voltage (narrow span/wide span) in this block.

4.2 INPUT

Determines input signal type at the external terminals. This block converts the input voltage/current into the internal digital data.

Parameter

Name	Explanations
Input type	Choose among the followings: 0 : 0 - 50 mA DC 1 : -1000 – +1000 mV DC 2 : -10 – +10 V DC

Utility

None available

4.3 INPUT VALUE

Converts the digital data into the input data representing voltage/current values.

Parameter

Name	Explanations
Filter time constant	First order lag filter. Time contact is selectable from 0.5 to 30 seconds. No filter is applied when set to 0.
Input zero adjustment X Input zero adjustment Y Input span adjustment	Input digital data is finely calibrated by using these two biases and one gain. Input Value = ([raw input data]* – [input zero adjustment X]**) x [input span adjustment] + [input zero adjustment Y] *Raw input data refers to the digital data converted from analog signal in Input Function Block. **Possible values for input zero adjustment X/Y and input span adjustment are -10000 to 10000. Only up to four digits (-9999 to 9999) of integer part in the input value can be displayed. When the integer part in a calculated input value on the above equation is exceeding four digits, the five or more digits are not displayed on the screen. eg. 10050.02 is to be displayed as 50.02

Utility

Name	Explanations
Fine zero adjustment	Adequate input zero adjustment X/Y values are automatically calculated by simply supplying the actual input current/voltage values. With the input signal equivalent to 0% applied, click this button to open a dialog box. Enter the measured input value.
Fine span adjustment	Adequate input span adjustment values are automatically calculated by simply supplying the actual input current/voltage values. With the input signal equivalent to 100% applied, click this button to open a dialog box. Enter the measured input value.
Reset fine adjustment	Resets the adjustment values to the default.
Trend graph	Shows the trend graph of Input Value.

4.4 INPUT %

Scales the input data to 0 to 100% range. Operational range is -15 to +115%. Input signals exceeding the limits are rounded to -15% and +115% respectively.

Parameter

Name	Explanations
0% Input	Enter the engineering unit value equivalent to 0% input. For example, entering 1.000 with the input type ±10 V means that 1.000 V is converted as 0% input, i.e. 0% input equals to 1.000 V. In order to adjust signal deviation of the device connected to the M2LV, 0% input is adjustable by 5% of the full scale range.
100% Input	Enter the engineering unit value equivalent to 100% input. For example, entering 5.000 with the input type ±10 V means that 5.000 V is converted as 100% input, i.e. 100% input equals to 5.000 V . In order to adjust signal deviation of the device connected to the M2LV, 100% input is adjustable by 5% of the full scale range.

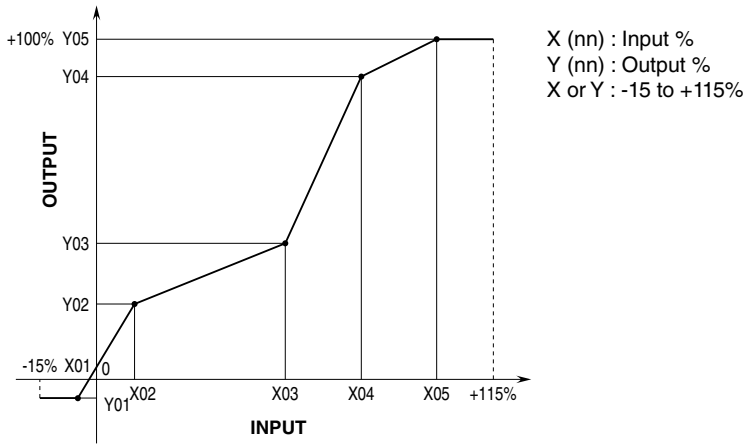
Utility

Name	Explanations
0% input calibration	With the input signal equivalent to 0% applied, click this button to automatically set the value as 0% input. This function is similar to the same field configuration function by 'One-Step Cal' mode.
100% input calibration	With the input signal equivalent to 100% applied, click this button to automatically set the value as 100% input. This function is similar to the same field configuration function by 'One-Step Cal' mode.
Reset input calibration	Resets the calibration range to the full-scale of selected input type.
Trend graph	Shows the trend graph of Input %.

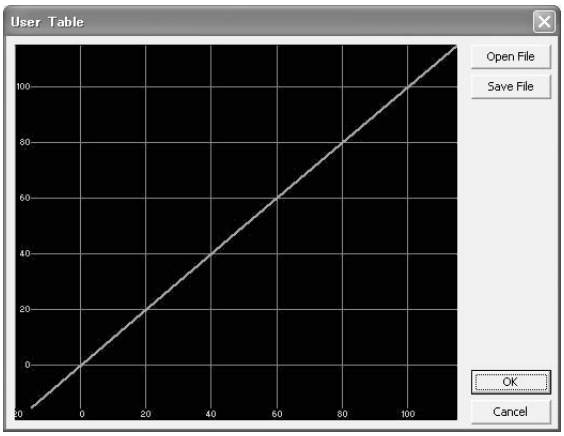
4.5 OUTPUT %

Determines either proportional or linearized conversion between input and output.

Parameter

Name	Explanations
Linearization	Choose either of the followings: 0 : Disable 1 : Enable With '0 : Disable' selected, the output % is proportional to the input %. With '1 : Enable' selected, the input % is converted into the output % according to a user specified table.
Number of points	Specify the number of calibration points in the linearization table (2 through 101).
X[0], Y[0] ... X[100], Y[100]	Enter pairs of X (input %) and Y (output %). Arrange in order from the smallest X value. Non-specified Xs and Ys, i.e. the range between two calibration points are approximated by a linear line. When the input value is out of the defined range, the closest Y value is applied. When the calibrated output value is lower than -15% or higher than +115%, -15% and +115% is output respectively. 

Utility

Name	Explanations
User table	Linearization tables are created and saved as files. Clicking [User Table] button opens the User Table window.  The graph shows the presently edited table. X axis represents Input %, while Y axis represents Output %. Click [Open File] in this window to show a pre-defined table data. Click [Save File] in this window to save the edited table data as files. Click [OK] to apply the edited table data. Click [Cancel] to quit the window without applying the edited table data. A linearization table data can be stored in a simple text format, created by Windows application software such as 'note pad.'
Trend graph	Shows the trend graph of Output %.

4.6 OUTPUT VALUE

Converts the output % data into a DC voltage/current output data.

Parameter

Name	Explanations
0% output	Enter the engineering unit value equivalent to 0% output. For example, entering 1.000 with the output type ±10 V means that 1.000 V is converted as 0% output, i.e. 0% output equals to 1.000 V. In order to adjust signal deviation at the connected device, 0% output is adjustable by 5% of the full scale range.
100% output	Enter the engineering unit value equivalent to 100% output. For example, entering 5.000 with the output type ±10 V means that 5.000 V is converted as 100% output, i.e. 100% output equals to 5.000 V. In order to adjust signal deviation at the connected device, 100% output is adjustable by 5% of the full scale range.

Utility

Name	Explanations
0% output calibration	Apply the input signal until the desired 0% output is measured and click this button to automatically set the value as 0% output. This function is similar to the same field configuration function by 'One-Step Cal' mode.
100% output calibration	Apply the input signal until the desired 100% output is measured and click this button to automatically set the value as 100% output. This function is similar to the same field configuration function by 'One-Step Cal' mode.
Reset output calibration	Resets the calibration range to the full-scale of selected output type.
Trend graph	Shows the trend graph of Output Value.

4.7 OUTPUT

Determines output signal type at the external terminals. This block converts the internal digital data into the output voltage/current.

Parameter

Name	Explanations
Output type	Choose among the followings: 0 : 0 - 20 mA DC 1 : -2.5 - +2.5 V DC 2 : -10 - +10 V DC
Output zero adjustment Output span adjustment	Output is finely calibrated by using these gain and bias. Output = [raw output value] x [output span adjustment] + [output zero adjustment]

Utility

Name	Explanations
Fine zero adjustment	Adequate output zero adjustment value is automatically calculated by simply supplying the actual output current/voltage values. With the 0% output signal, click this button to open a dialog box. Enter the measured output value.
Fine span adjustment	Adequate output span adjustment value is automatically calculated by simply supplying the actual output current/voltage values. With the 100% output signal, click this button to open a dialog box. Enter the measured output value.
Reset fine adjustment	Resets the adjustment values to the default.
Loop test output	Simulated signal is output for loop test purpose. Clicking [Loop Test Output] button opens the Loop Test Output window. Choose [Set output for current input value] to hold the present output value regardless of input changes. Choose [Set output for specified value] to supply a specific output value and hold it regardless of input changes. Choose [Exit fixed output mode (normal state)] to cancel loop test output so that the output signal starts tracking the input signals.

4.8 DEVICE INFO

Device information is available for reference while the device in connected online. This button is not usable while other functions such as Open File, Save File, Compare, are activated.

Parameter

Name	Explanations
Type	Type number of the device
Firmware	Firmware revision number of the device
Serial	Serial number of the device
Tag No.	Tag name. This parameter is the only selectable one among Device Info. Max. 16 alphanumerical characters. Characters exceeding this limit are ignored.

APPENDIX - 1. LINEARIZATION TABLE FORMAT

Linearization data is saved in .text format with components as indicated below.

```
/* User linearization table comment */
{
         -15.000,   -15.000
           0.000,     1.000
          50.000,    49.000
         115.000,   115.000
}
```

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

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

Each row contains Xn and Yn represented in %, paired and separated by a comma.

Data must be arranged in order from the smallest Xn.

Max. 101 pairs of 'Xn, Yn' can be described.