Model M3LLC STRAIN GAUGE TRANSMITTER

PC CONFIGURATOR SOFTWARE

Model: M3LLCCFG

USERS MANUAL

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CONTENTS

1. GETTING STARTED

1.1. PC REQUIREMENTS

The following PC performance is required for adequate operation of the M3LLCCFG.

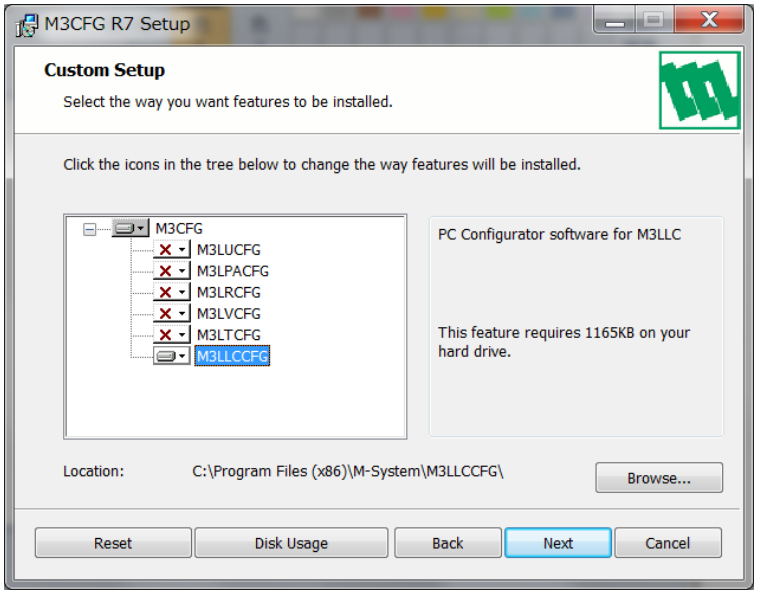
PC	IBM PC compatible
OS	Windows 7 (32-bit, 64-bit) Windows 10 (32-bit, 64-bit) The software may not operate adequately in certain conditions.
CPU/Memory	Must meet the relevant Windows' requirements.
Hard disk	10MB minimum free space
PC configurator cable	Model COP-US (USB) or MCN-CON (RS-232-C)

1.2. INSTALLING & DELETING THE PROGRAM

INSTALL

The program is provided as compressed archive. Decompress the archive and execute 'setup.msi' to start up the M3LLCCFG installer program. Follow instructions on the Windows.

In the M3LLCCFG installer program, all the software of the M3CFG series will be installed. If you would like to install only M3LLCCFG, X out other software in the window appeared during the installation as shown below.



DELETE

Open Control Panel > Add/Remove Programs. Select the "M3CFG Rx" from the program list and click Delete button.

1.3. STARTING UP THE M3LLCCFG

Connect the model M3LLC Strain Gauge Transmitter to the PC via the PC configurator cable.

Click Start on the task bar and choose M3CFG > M3LLCCFG from the Program menu.

1.4. OPTION /A & OPTION /B

The M3LLC with Option /B is not designed for PC configuration but only for monitoring on the PC, while the Option /A version is fully programmable.

OPTION /B

When you connect the Option /B version to the PC and start up the M3LLCCFG program, you can confirm the current settings but these buttons and fields used for configuring the module are grayed out and thus unavailable.

The M3LLCCFG features available for the Option /B version are: monitoring, One Step Calibration, zero/span, loop test output and diagnostics.

OPTION /A

The Option /A version is fully programmable including the followings: Excitation (coarse and fine) Setting, Zero Offset Setting, Sensor Calibration, Load Coefficient and Moving Average Setting.

Before connecting the M3LLC Strain Gauge Transmitter to the PC and turning its power supply on, be sure to set the module to 'PC Configuration Mode' by turning on its DIP SW3-3. This will enables the transmitter to store PC-configured settings into the EEPROM and operate on them regardless of other DIP SW settings.

The user can configure and adjust the Option /A version module on the PC even in 'DIP SW Configuration Mode', but these settings are overridden by the DIP SW settings when the module restarts by its power supply turned off and on.

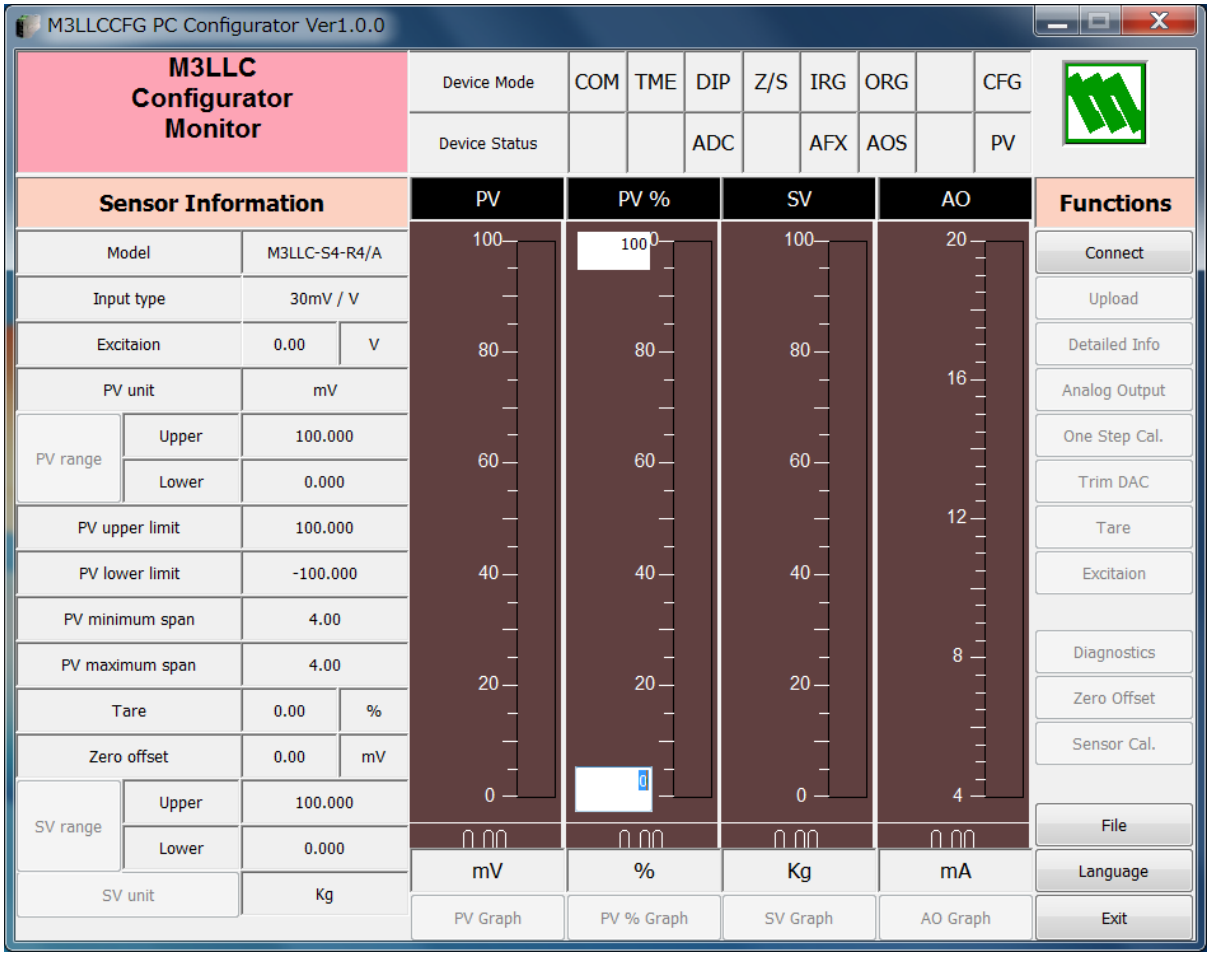
2. MONITOR

2.1. STARTING UP

Figure 1 shows the initial window of the M3LLCCFG PC Configurator window.

In order to enable the tools shown on the screen, a model M3LLC Strain Gauge Transmitter must be connected to the PC via the PC configurator cable.

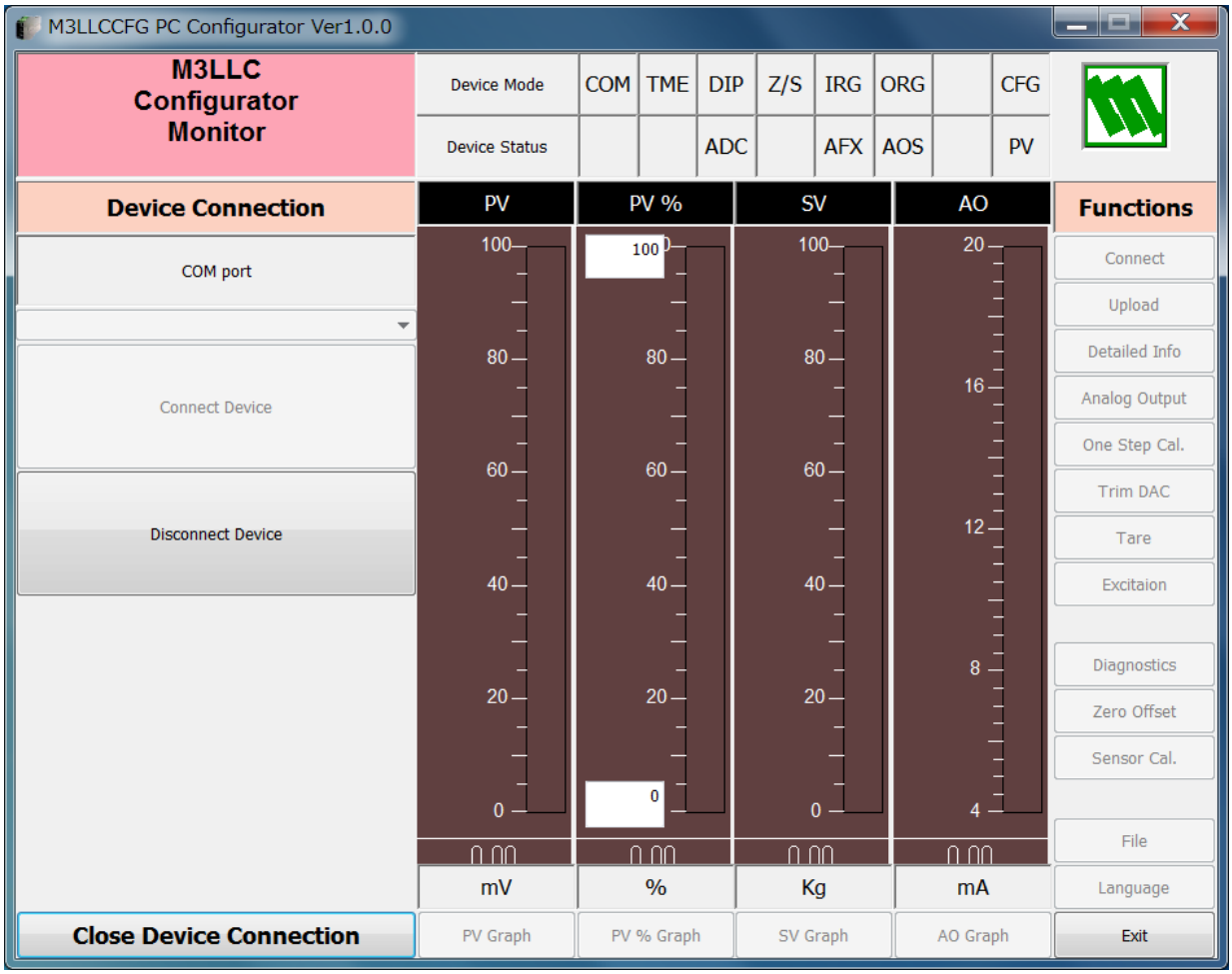
Figure 1. Initial Window



2.2. CONNECTING THE DEVICE

On the initial window, click [Connect] and the [Device Connection] menu appears on the screen.

Figure 2. Device Connection



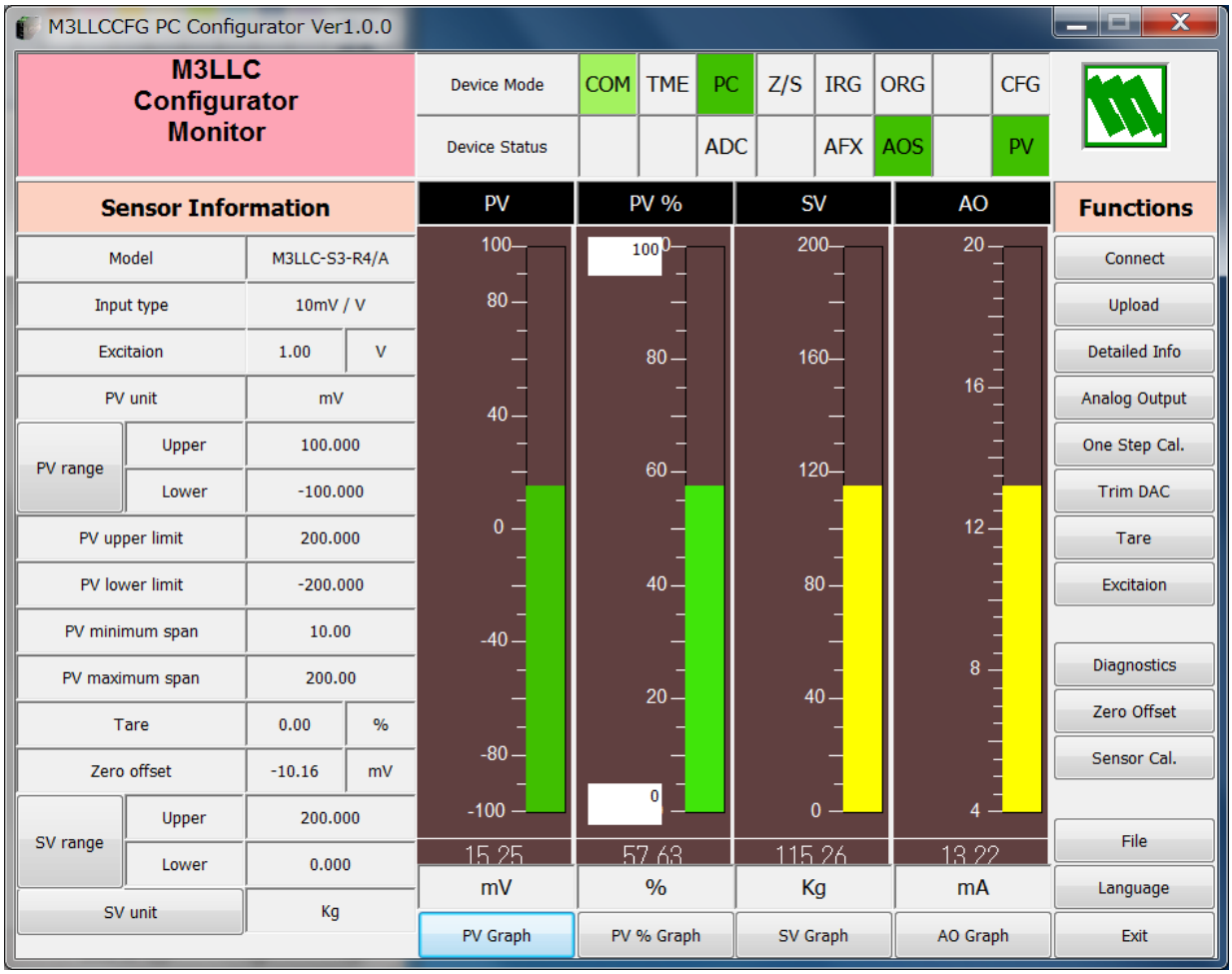
COM port	Choose an adequately configured COM port to be connected.
Connect Device	Connects the device. Once the connection is established, the program uploads the device's configuration information and automatically opens Sensor Information window. The window is the base for various operations to configure the M3LLC.
Disconnect Device	Disconnects the currently connected device.
Close Device Connection	Close the Device Connection window.

2.3. MONITORING TRENDS

Once the device is connected, the Sensor Information menu and the trend monitors appear on the screen. The user can configure various parameters of the M3LLC.

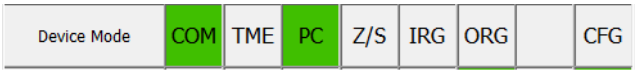
Use [Upload] button to re-load device information e.g. when you replace the module with a new one or when you make changes to M3LLC's configuration without using this tool.

Figure 3. Sensor Information

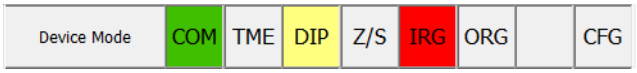


2.3.1. DEVICE MODE

Device Mode displays the device's current operation status and communications status with the PC with lamps.



or



[COM] lamp	Blinks with the normal communications condition.
[TME] lamp	Red light turns on when the device detects the communications time out.
[DIP]/[PC] lamp	Shows the device's configuration mode: DIP switch or PC. For the M3LLC version /B, only DIP switch mode is available.
[Z/S] lamp	Red light turns on when the device is in the DAC trimming mode.
[IRG] lamp	Red light turns on when the device is in the input one-step calibration mode.
[ORG] lamp	Red light turns on when the device is in the output one-step calibration mode.
[CFG] lamp	Red light turns on when data changes have been made on the configuration software. It turns off once the data has been stored into the nonvolatile memory.

2.3.2. DEVICE STATUS

Device Status displays the current device status with lamps.

[ADC] lamp	Red light turns on with ADC's hardware errors.
[AFX] lamp	Red light turns on when the analog output enters Fixed AO mode. The light is off in a normal state where the output tracks the input signals.
[AOS] lamp	Green light turns on when the analog output is diagnosed to be normal. Red light turns on when the output is saturated upscale or downscale.
[PV] lamp	Green light turns on when the sensor input is in the specified range. Red light turns on when it is out of the range.

2.3.3. BARGRAPH & TREND GRAPH

Four bargraphs indicating PV (the input sensor signal) in mV, PV in % of the selected range, SV (the input converted into engineering unit) and analog output in engineering unit are available.

The graph scales for PV in % can be modified unlike the PV, SV and analog output of which the scales are automatically determined and fixed according to the selected range.

At the bottom of each bargraph is [Graph] button which opens a trend graph for the item. Use [Start] and [Stop] buttons to start/stop recording data, and click [Close Trend Graph] to close the graph window.

PV Bargraph

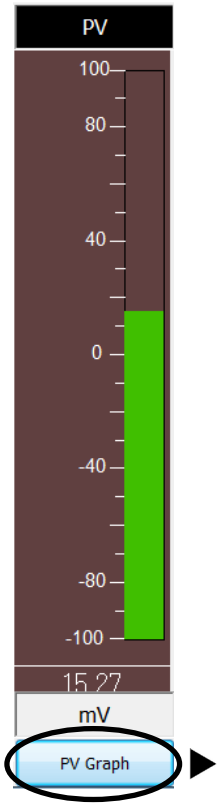
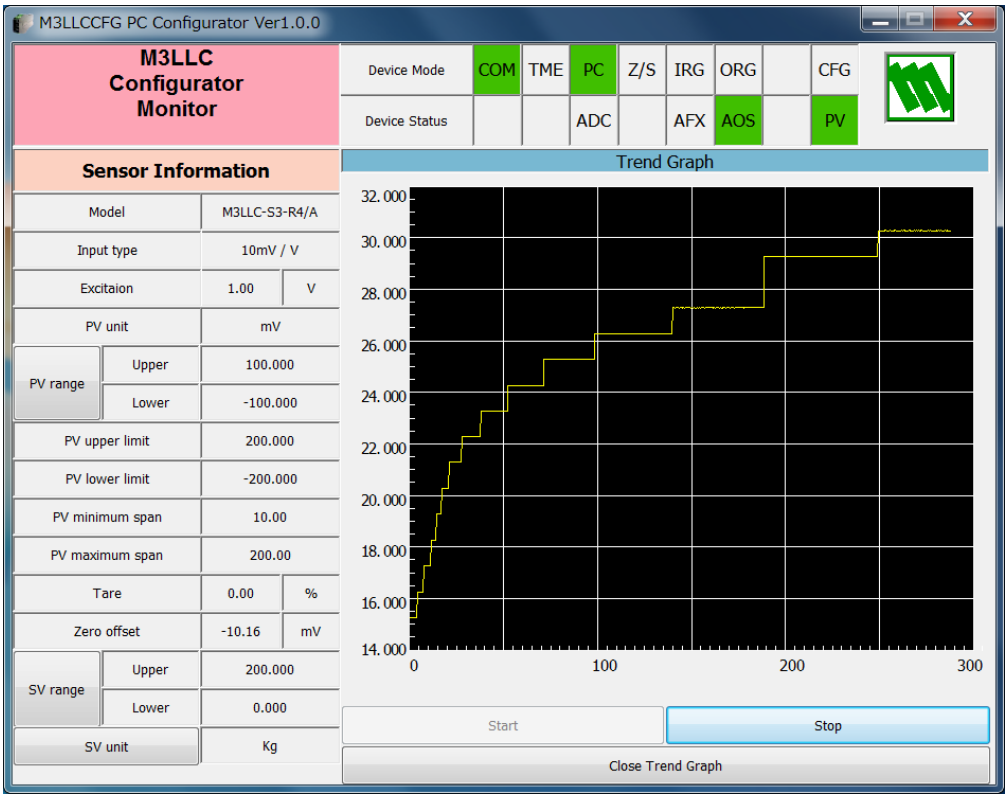


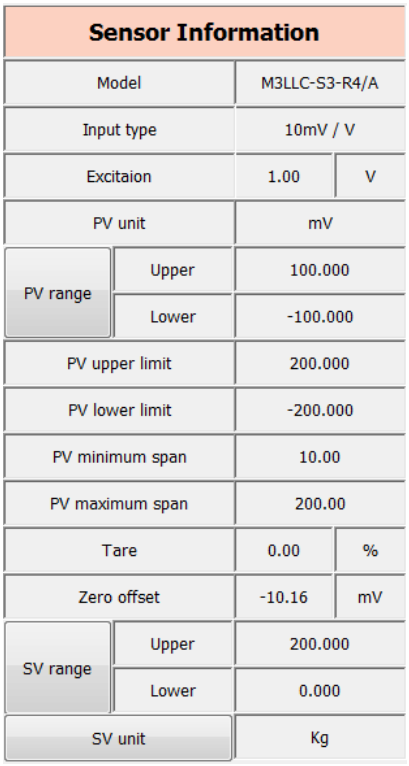
Figure 4. Trend Graph



3. CONFIGURATION

3.1. INPUT CONFIGURATION

In Figure 3, the Sensor Information menu on the left shows basic configuration information of the connected device. When you need to change configurations, click the left button for the required parameter to modify its setting.

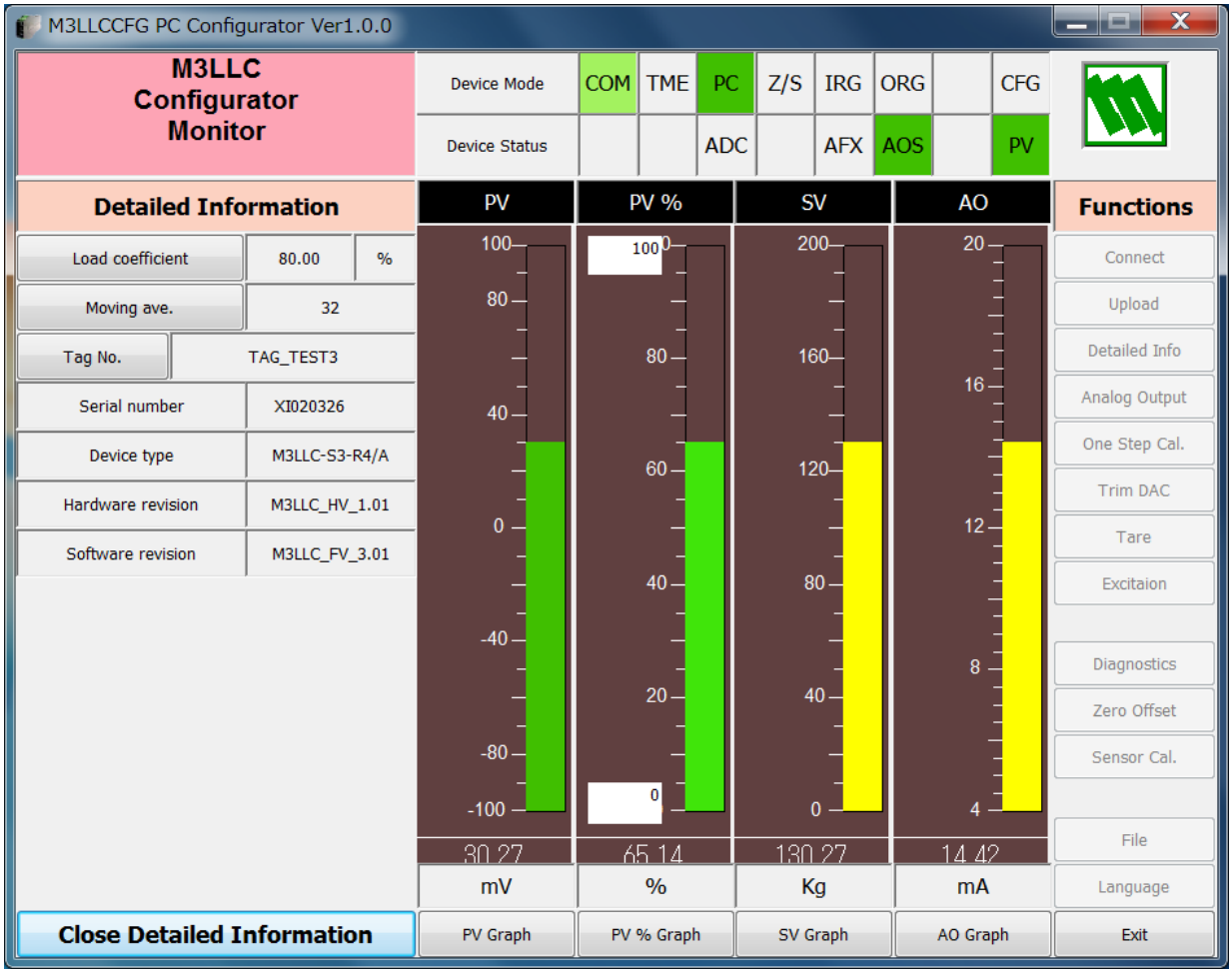


Model	Shows the model number of the device.
Input type	Shows the rating of strain gauge combined to the transmitter.
Excitation	Shows the selected excitation value.
PV unit	Shows 'mV'.
PV range (Upper / Lower)	Specifies input range for 0% and 100%. Click the left button opens a dialog box to change the setting. The input range can be also changed on One Step Calibration mode. Note that the Zero Offset is automatically adjusted when the input range is changed on One Step Calibration mode, while it must be separately adjusted on Sensor Information window.
PV upper/lower limit	Shows the usable range information for the selected type of sensor.
PV minimum/maximum span	
Tare	Shows the current tare adjustment value in %. When the input range setting is changed, it is automatically reset to 0%.
Zero offset	Shows the adjusted zero offset value in mV.
SV range	Specifies the actual input range in engineering unit such as weight.
SV unit	Shows the engineering unit for the SV. Click the left button to enter an optional engineering unit using up to eight one-byte alphanumeric characters and symbols.

3.2. DETAILED INFORMATION

In Figure 3, click [Detailed Info] in Functions menu to the right opens the [Detailed Information] menu as shown in Figure 5.

Figure 5. Detailed Information

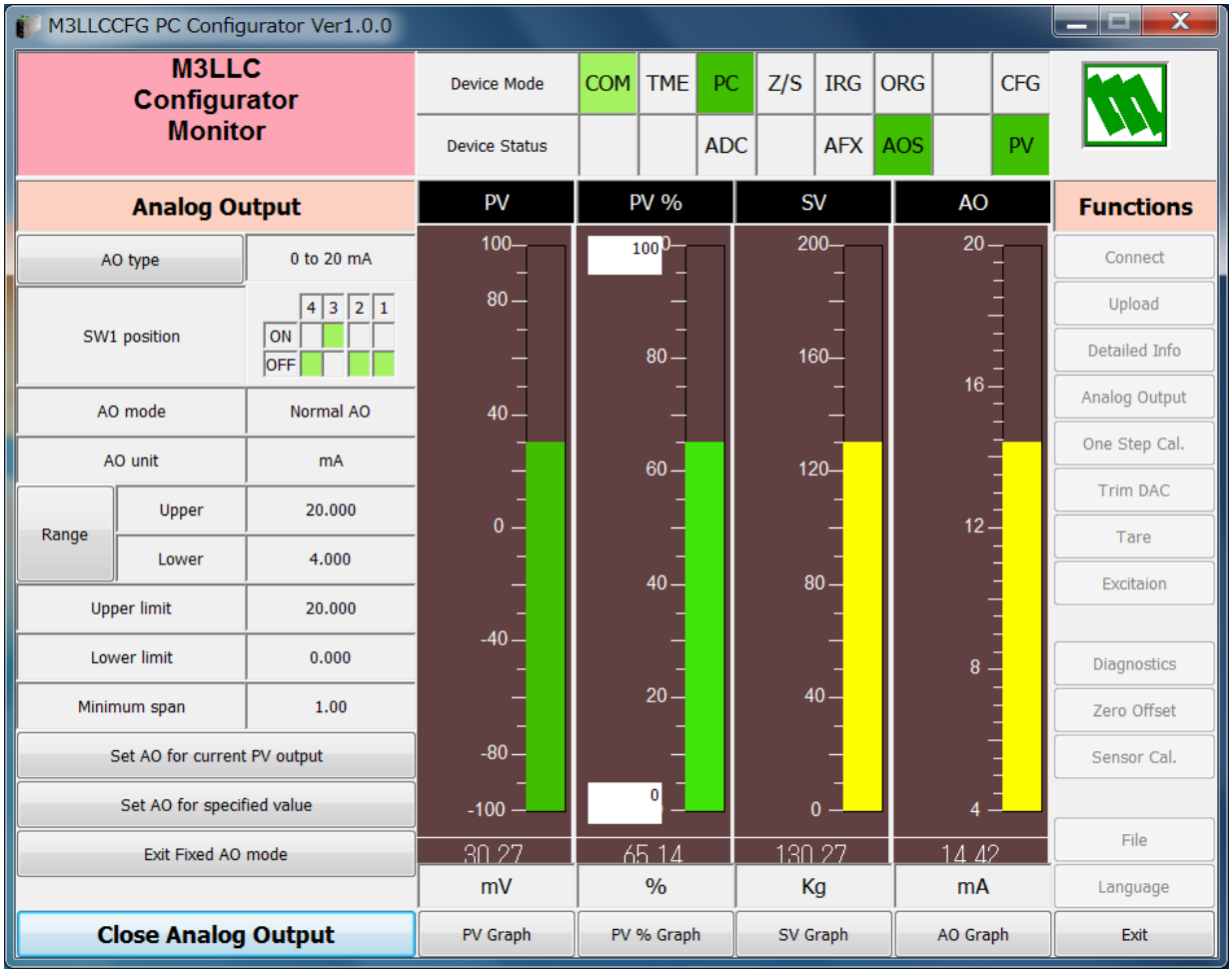


Load coefficient	Specifies the load coefficient in %. The Load Coefficient is used when setting the full-scale input range during One Step Calibration. When this coefficient is set to 100%, you have to apply actual 100% load (weight) in order to set the 100% range. Meanwhile, when the coefficient is set to 10%, for example, you can set the 100% range by applying a simulated weight of one tenth (1/10) as heavy as the actually required 100% weight. Selectable range is from 10% up to 100%.
Moving ave.	Specifies the number of samples to be averaged. Selectable range is from 1 up to 64. When you do not need this function, specify '1.'
Tag No.	You can enter a tag name using up to sixteen alphanumeric characters.
Serial number	Automatically displayed
Device type	
Hardware revision	
Software revision	
Close Detailed Information	Close the window.

3.3. ANALOG OUTPUT

In Figure 3, click [Analog Output] in Functions menu to the right opens the [Analog Output] menu as shown in Figure 6.

Figure 6. Analog Output



The Analog Output menu on the left shows the output type and ranges. When you need to change configurations, click the left button for the required item to modify the setting.

AO type	Specifies the Analog Output type from among three choices. 0 to 20 mA -2500 to +2500 mV -10 to +10 V Click [AO type] button to specify output type.
SW1 position	Shows DIP SW configuration (hardware setting) required for the selected output type. Confirm the actual setting.
AO mode	Shows the output mode. 'Normal AO' is usually displayed.
AO unit	Shows engineering unit for the output signal.
Range (Upper / Lower)	Specifies the output range for 0% and 100%.
Upper limit	Show the usable range information for the selected output type.
Lower limit	
Minimum span	
Set AO for current PV output	The output signal is held at the current value.
Set AO for specified value	You can set a specific value to fix the output in order to perform an output loop simulation test.
Exit Fixed AO mode	Cancels the fixed output mode to return the device to normal output mode.
Close Analog Output	Close the window.

3.4. TARE

In Figure 3, click [Tare] button in Functions menu to the right opens the [Tare] menu as shown in Figure 7.

Tare adjustment is usually conducted through an external contact input (Tare Command Input, DI). You can set current sensor input signal as tare on this window.

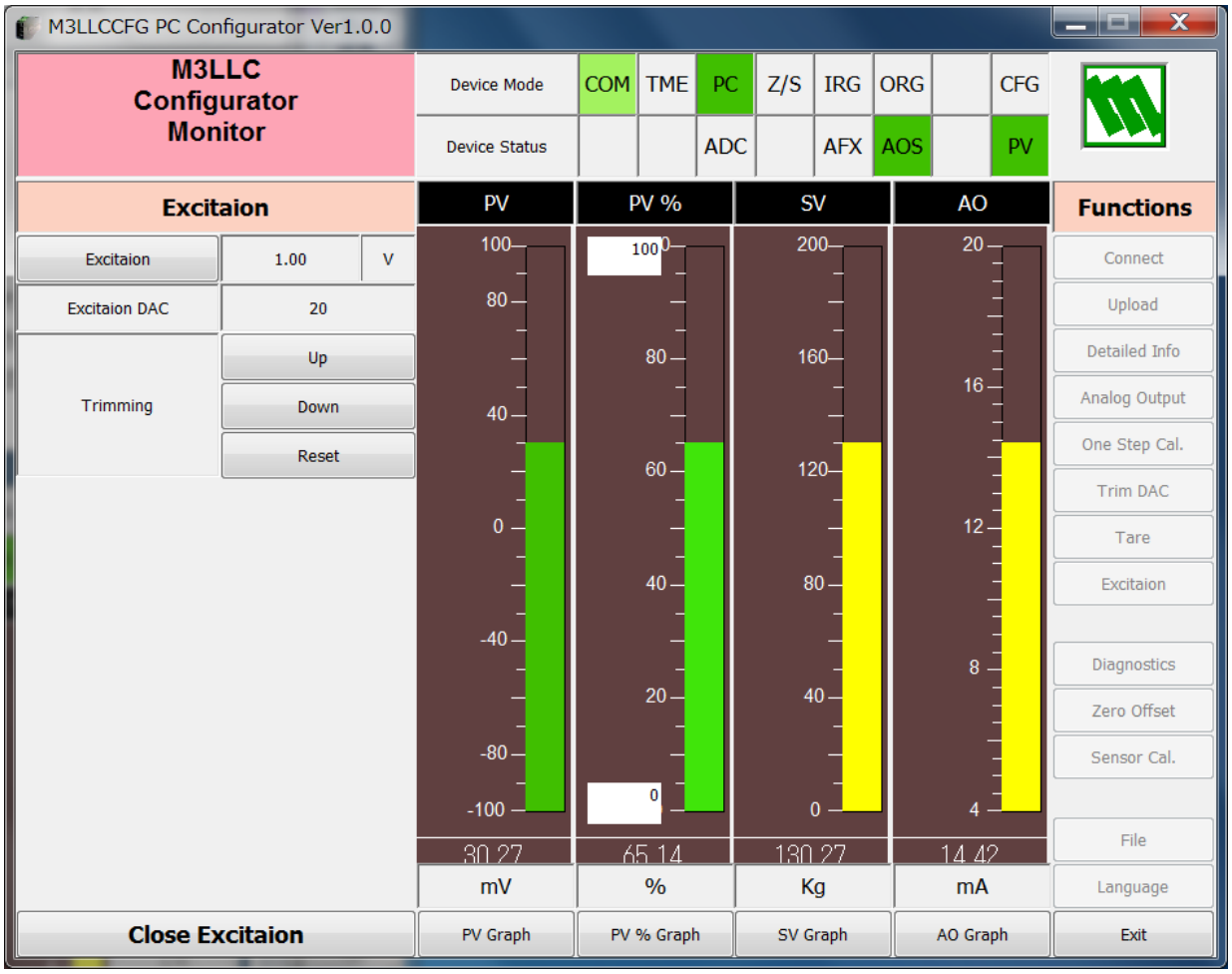
Figure 7. Tare

Tare value	Shows current tare value in %. With no tare adjustment made, it shows 0%. Whenever the input range is changed, it is reset to 0%.
Set Tare	Set current sensor input as tare, 0% input.
Reset Tare	Reset the set tare value to 0%.
Close Tare	Close the window.

3.5. EXCITATION

In Figure 3, click [Excitation] button in Functions menu to the right opens the [Excitation] menu as shown in Figure 8. DIP SW setting is invalid in PC Configuration Mode. In DIP SW Configuration Mode, only Trimming (fine adjustments) is available on this window.

Figure 8. Excitation



Excitation	Shows present excitation value in V. In PC Configuration Mode, click the left button and enter a desired excitation value. In DIP SW Configuration Mode, this setting is unavailable but when you change the setting using DIP/rotary switches, the new value is shown on this window.
Excitation DAC	Shows DAC value for the excitation output.
Trimming	[Up] and [Down] buttons are used to fine adjustment. Every time you click [Up], the output DAC increases by 1 bit, while you click [Down], the DAC decreases by 1 bit. 1 bit is approximately equal to 0.05 V. Click [Reset] to cancel these fine adjustments to the initial value.
Close Excitation	Close the window.

3.6. ZERO OFFSET

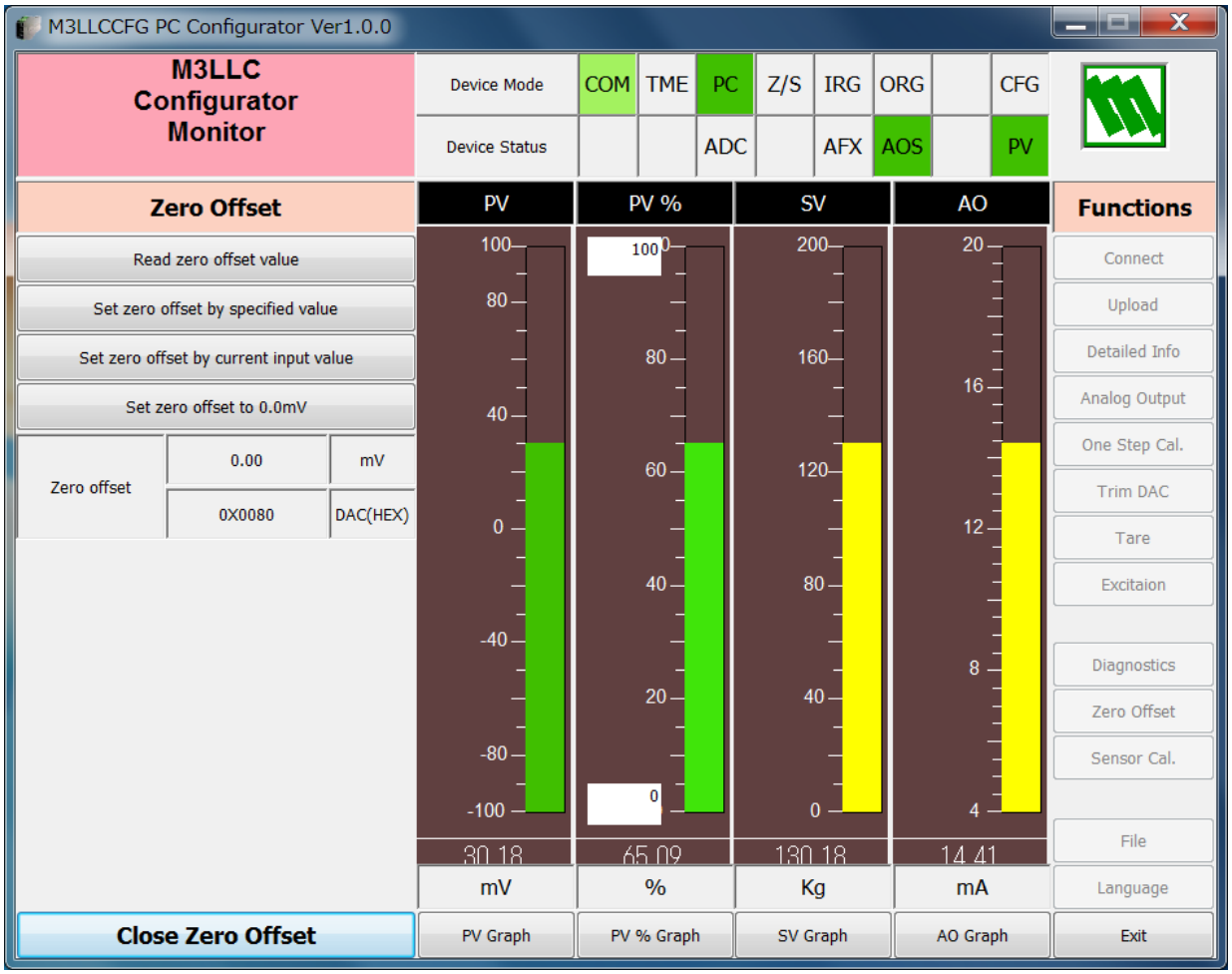
In Figure 3, click [Zero Offset] button in Functions menu to the right opens the [Zero Offset] menu as shown in Figure 9.

With the input sensor rating 1.0 mV/V, for example, the maximum measurable range, with no Zero Offset, is from -10 mV to +10 mV. On the other hand, with the Zero Offset set to 10 mV, the maximum range is from 0 mV to 20 mV. In this way, the Zero Offset widens the measurable range to ±20 mV, with the maximum span 20 mV.

Combining the Input Range setting and Zero Offset setting enables to widen the maximum span from 10 mV to 20 mV.

In case of One Step Calibration, simulated 0% input is automatically applied as Zero Offset value, thus the maximum span remains 10 mV.

Figure 9. Zero Offset



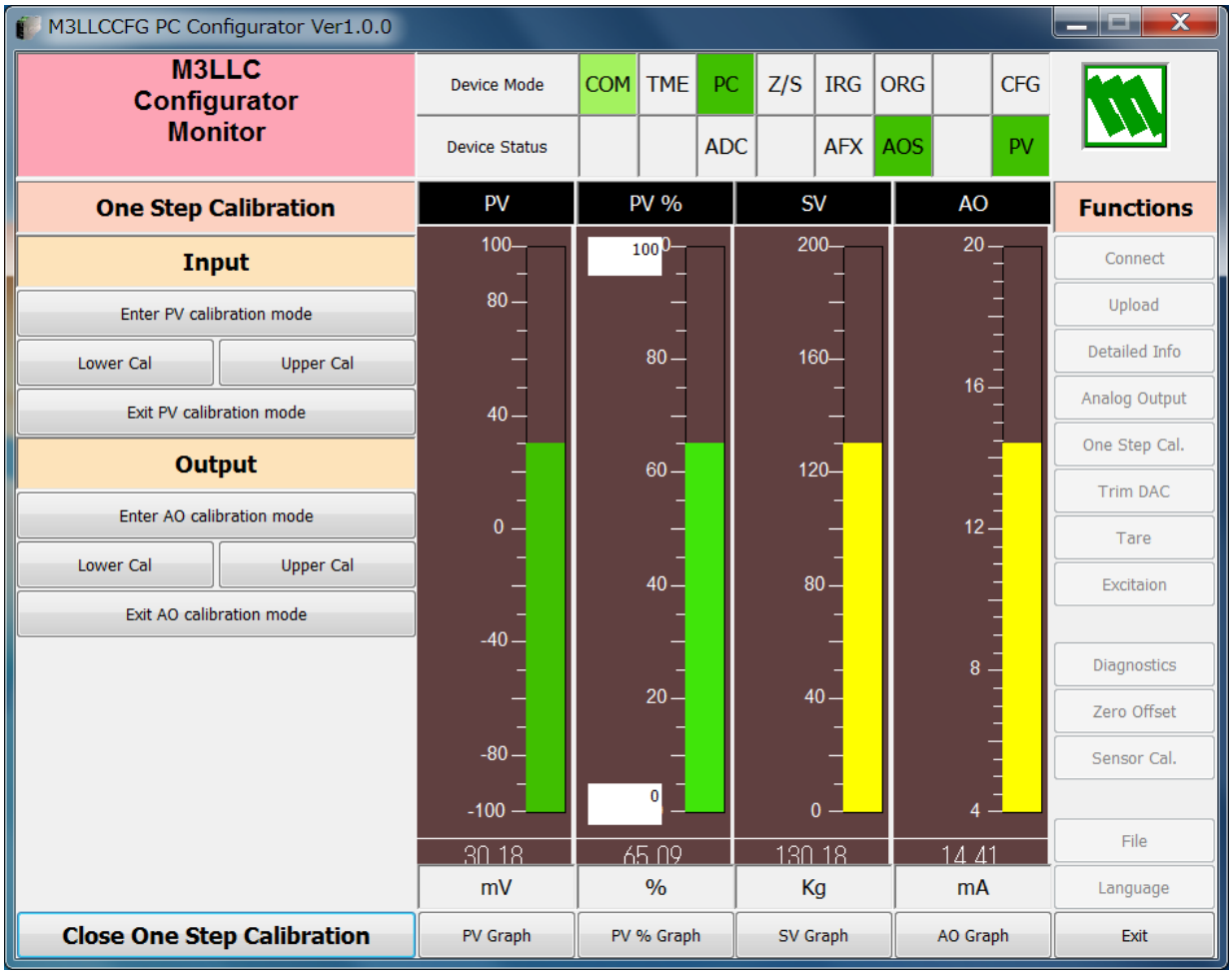
Read zero offset Value	Reload the current offset setting.
Set zero offset by specified value	Specifies the offset by a specific value in mV. Allowable range: corresponding DAC output value falls within the range of 0x00 - 0xFF. The entered value is shown in mV in Zero Offset field.
Set zero offset by current input value	Specifies the offset by a simulated input. Currently applied millivolt value is set.
Set zero offset to 0.0 mV	Reset the offset value to 0.0 mV.
Zero Offset	Shows current offset setting in mV and DAC value.
Close Zero Offset	Close the window.

4. ONE STEP CALIBRATION

In Figure 3, click [One Step Cal] on the right control panel opens the [One Step Calibration] menu as shown in Figure 10.

The ‘One Step Calibration’ technique realizes automatic input and output range settings with a signal simulator connected to the module’s input terminals.

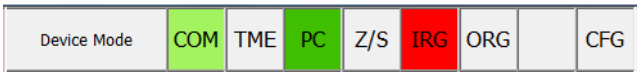
Figure 10. One Step Calibration



4.1. INPUT CALIBRATION MODE

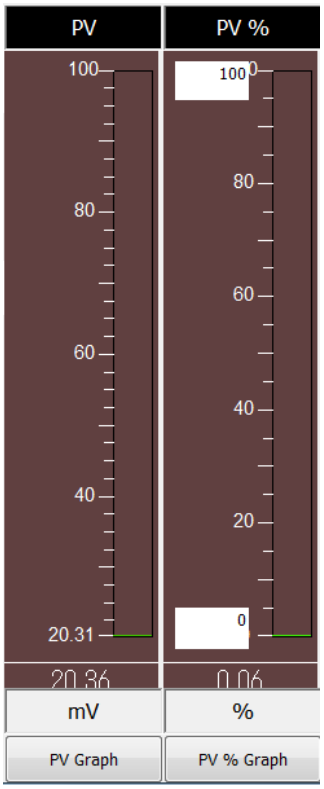
(1) Connect the M3LLC to a simulator and a multimeter as described in the M3LLC instruction manual.

(2) Click [Enter PV calibration mode] in order to turn the module into the input calibration mode. The red [IRG] lamp in [Device Mode] panel at the top turns ON while the module is in this mode.

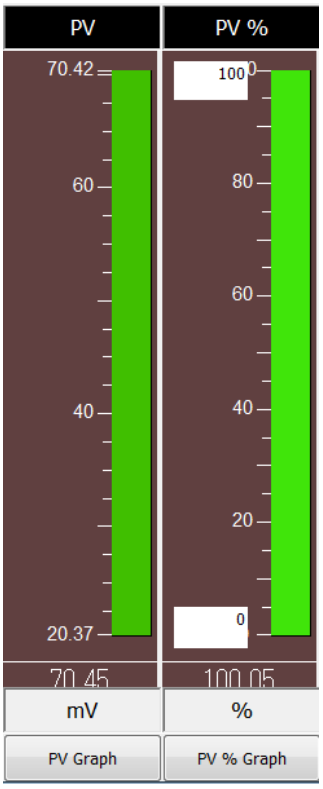


(3) Apply desired 0% and 100% signal levels and click [Lower Cal] and [Upper Cal] buttons respectively so that the input range is automatically set.

Input: 20 mV (Lower Cal)



Input: 70 mV (Upper Cal)



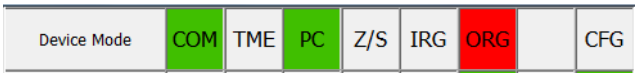
(4) Click [Exit PV calibration mode] when the calibration is complete.

(5) Click [Close One Step Calibration] to close the window.

4.2. OUTPUT CALIBRATION MODE

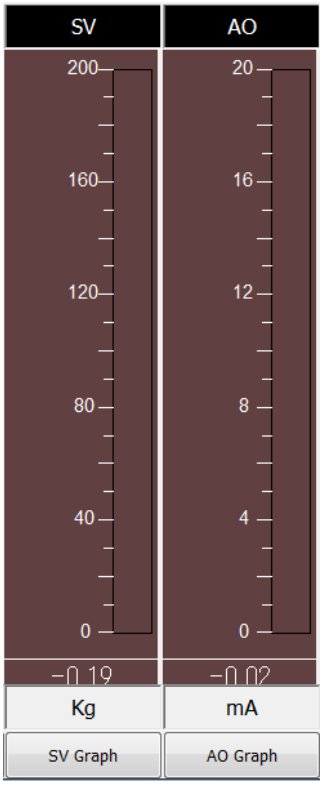
(1) Connect the M3LLC to a simulator and a multimeter as described in the M3LLC instruction manual.

(2) Click [Enter AO calibration mode] in order to turn the module into the output calibration mode. The red [ORG] lamp in [Device Mode] panel at the top turns ON while the module is in this mode.

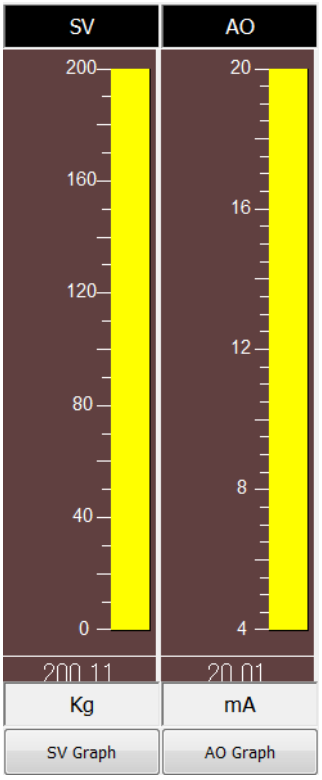


(3) Increase or decrease the simulated input until the output multimeter shows desired 0% and 100% signal levels and click [Lower Cal] and [Upper Cal] buttons respectively so that the output range is automatically set.

Apply the input so that output becomes 0%



Apply the input so that output becomes 100%



(4) Click [Exit AO calibration mode] when the calibration is complete.

(5) Click [Close One Step Calibration] to close the window.

5. INPUT / OUTPUT CALIBRATION

5.1. DAC TRIMMING

Click [Trim DAC] button to open the Trim DAC window as shown in Figure 11.

Figure 11. Trim DAC (e.g. Upper Range Trim Mode)

5.1.1. LOWER RANGE DAC TRIMMING

(1) Click [Enter Lower Range Trim mode]. The device outputs a fixed lower range signal level.

(2) Measure the actual output signal at the receiving instrument to which the device output should be matched.

(3) Click [Trim by actual measured value] to set the measured value.

(4) Repeat setting [Trim by actual measured value] until the measured output shows the desired level. Or, use [Up] or [Down] buttons. [+], [++] and [+++] have different increments. Deviation from the default value is shown in [Zero offset].

5.1.2. UPPER RANGE DAC TRIMMING

(1) Click [Enter Upper Range Trim Mode]. The device outputs a fixed upper range signal level.

(2) Measure the actual output signal at the receiving instrument to which the device output should be matched.

(3) Click [Trim by actual measured value] to set the measured value.

(4) Repeat setting [Trim by actual measured value] until the measured output shows the desired level. Or, use [Up] or [Down] buttons. [+], [++] and [+++] have different increments. Deviation from the default value is shown in [Span gain].

5.1.3. RESETTING TO THE DEFAULT

Click [Clear Trim DAC data] to return the device to the factory default trimming values (0.0 for both Zero offset and Span gain).

Click [Close Trim DAC] to close the window.

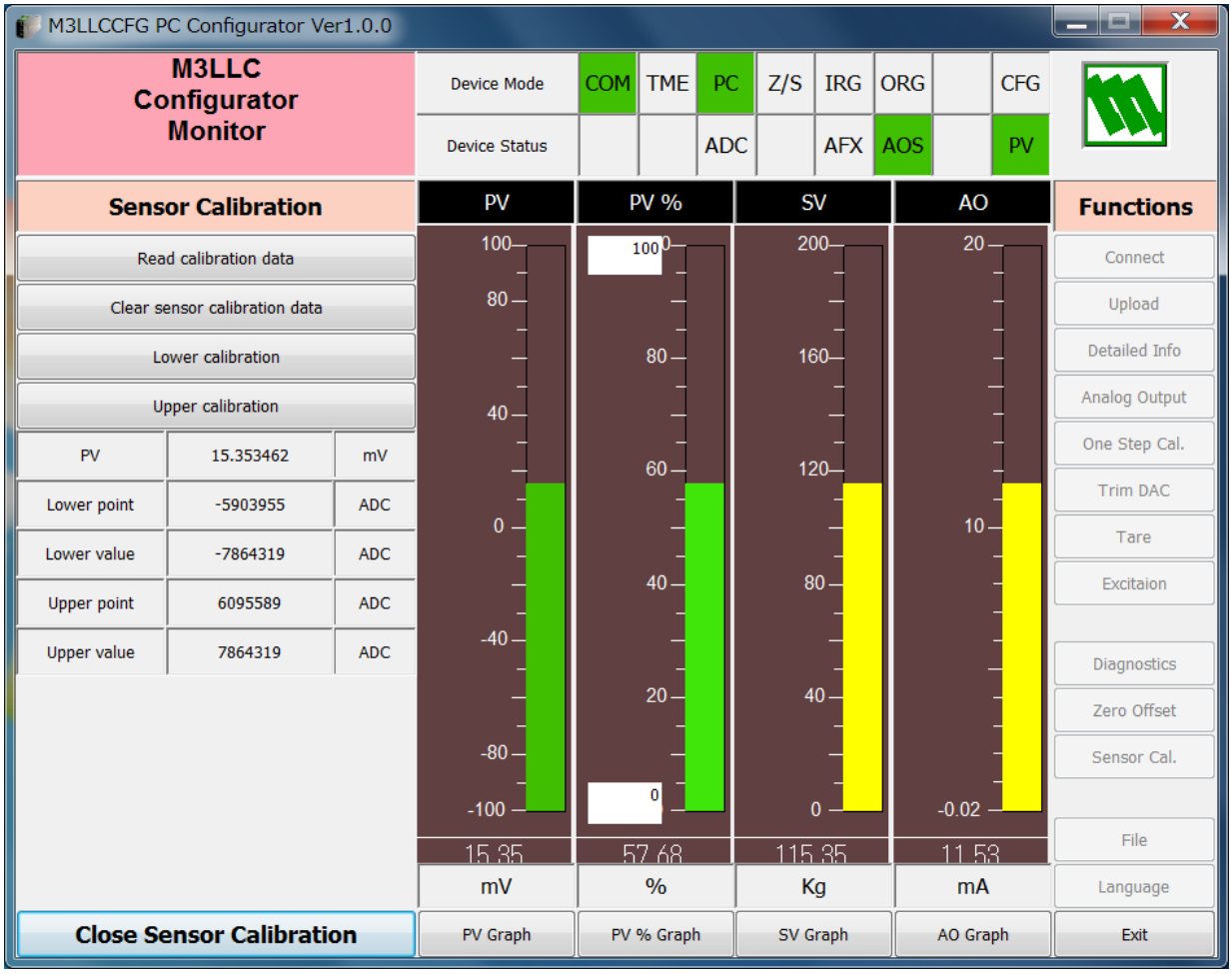
5.2. SENSOR CALIBRATION

Without any sensor calibration, actual input sensor's voltage value and PV value indicator's value may be slightly different. However, with One Step Calibration, the output signals are calibrated to correspond to the PV value that matches the input sensor's voltage. Then only the PV display remains with slight deviation from the input sensor's voltage.

The Sensor Calibration function enables to match the input sensor's millivolt and the PV display.

Click [Sensor Cal] button to open the Sensor Calibration window as shown in Figure 12.

Figure 12. Sensor Calibration



[PV] shows the present measured value. Refer to this value when calibrating the sensor. It takes several seconds for the calibration result affects the measured value on the display.

Apply the lower calibration point input signal and wait until the PV display is stabilized. Click [Lower Calibration] to open the field where you can enter the target value (applied input voltage in mV). The result is shown in the PV display field. The data before calibration is shown in the Lower Point field, while the data after calibration is shown in the Lower Value field.

Apply the upper calibration point input signal and wait until the PV display is stabilized. Click [Upper Calibration] to open the field where you can enter the target value (applied input voltage in mV). The result is shown in the PV display field. The data before calibration is shown in the Upper Point field, while the data after calibration is shown in the Upper Value field.

[Read Calibration Data] calls up and displays the present calibrated values in these fields.

Click [Clear Sensor Calibration Data] to return the device to the factory default status.

Either Upper or Lower Calibration can be performed first.

Perform the calibration after Zero Offset setting, when accuracy is emphasized.

Click [Close Sensor Calibration] to close the window.

6. OFFLINE CONFIGURATION AND READ / WRITE FILES

6.1. FILE MANAGEMENT

The M3LLC's configurations can be saved in a file and then read out to be downloaded to multiple modules.

Click [File] button to open the File Management window as shown in Figure 13.

While this window is active, the device connection is severed, therefore the device can be connected and disconnected freely except during Upload or Download operations.

The window is divided in two sections: 'File Configuration' and 'Device Configuration.' 'File Configuration' shows data transfer (Read or Write) between the PC Configurator and the PC, while 'Device Configuration' shows data transfer (Upload or Download) between the configurator and the device.

Click [Exit] to complete the file management operations. The device will remain disconnected and must be 'Connected' to start monitoring.

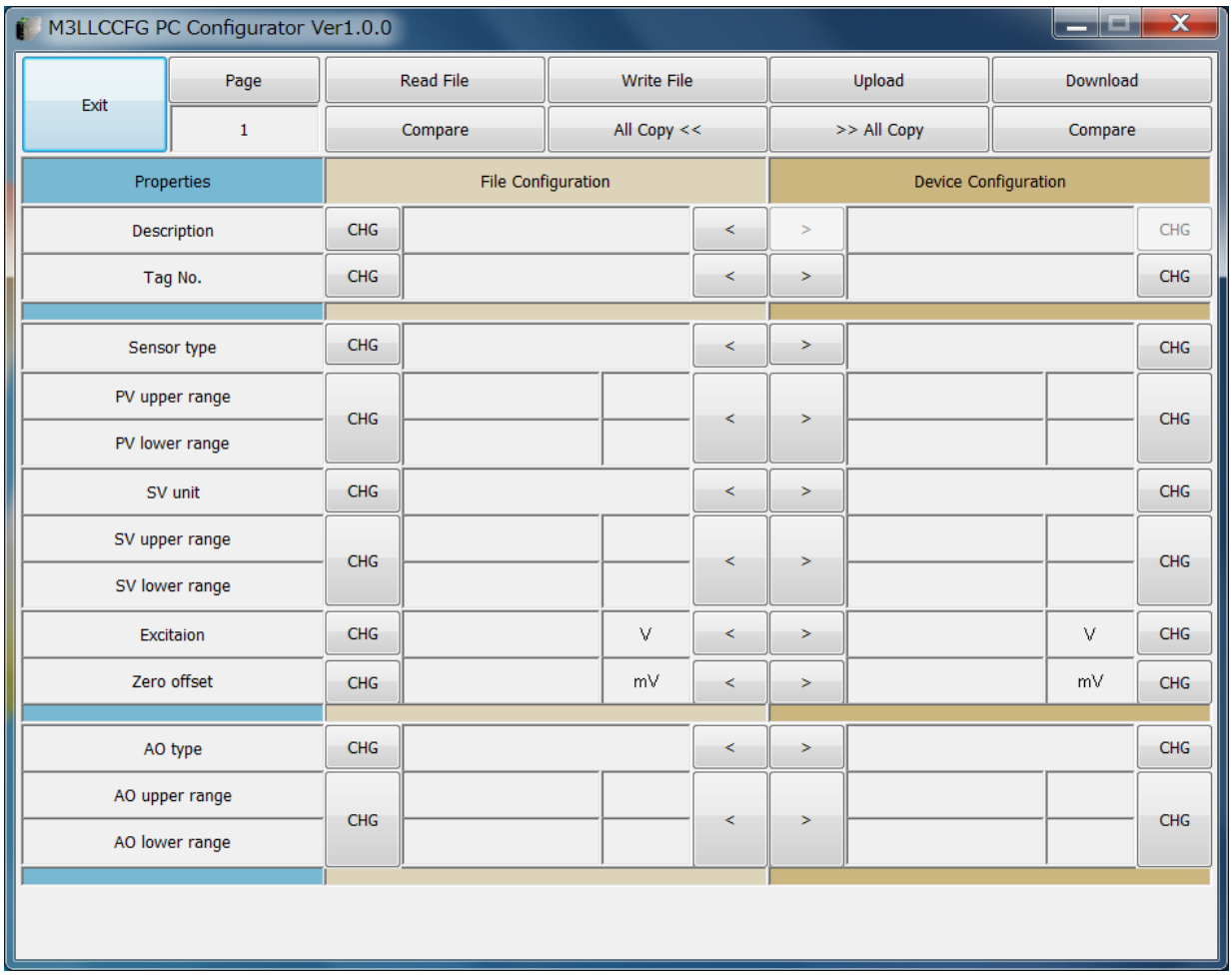
NOTE

(1) Validity of the selected range values is not verified in this window. Please make sure to set them according to the described specifications.

(2) With the Option /B version, Download is unavailable. However, Upload is possible to save a configuration file, or to compare with other configurations.

(3) A comment can be entered in 'Description' in File Configuration section, which is saved in a configuration file. It cannot be written in the device. When a setting is uploaded from device, the relevant field in Device Configuration shows the device's serial number.

Figure 13. File



6.1.1. MODIFYING PARAMETERS

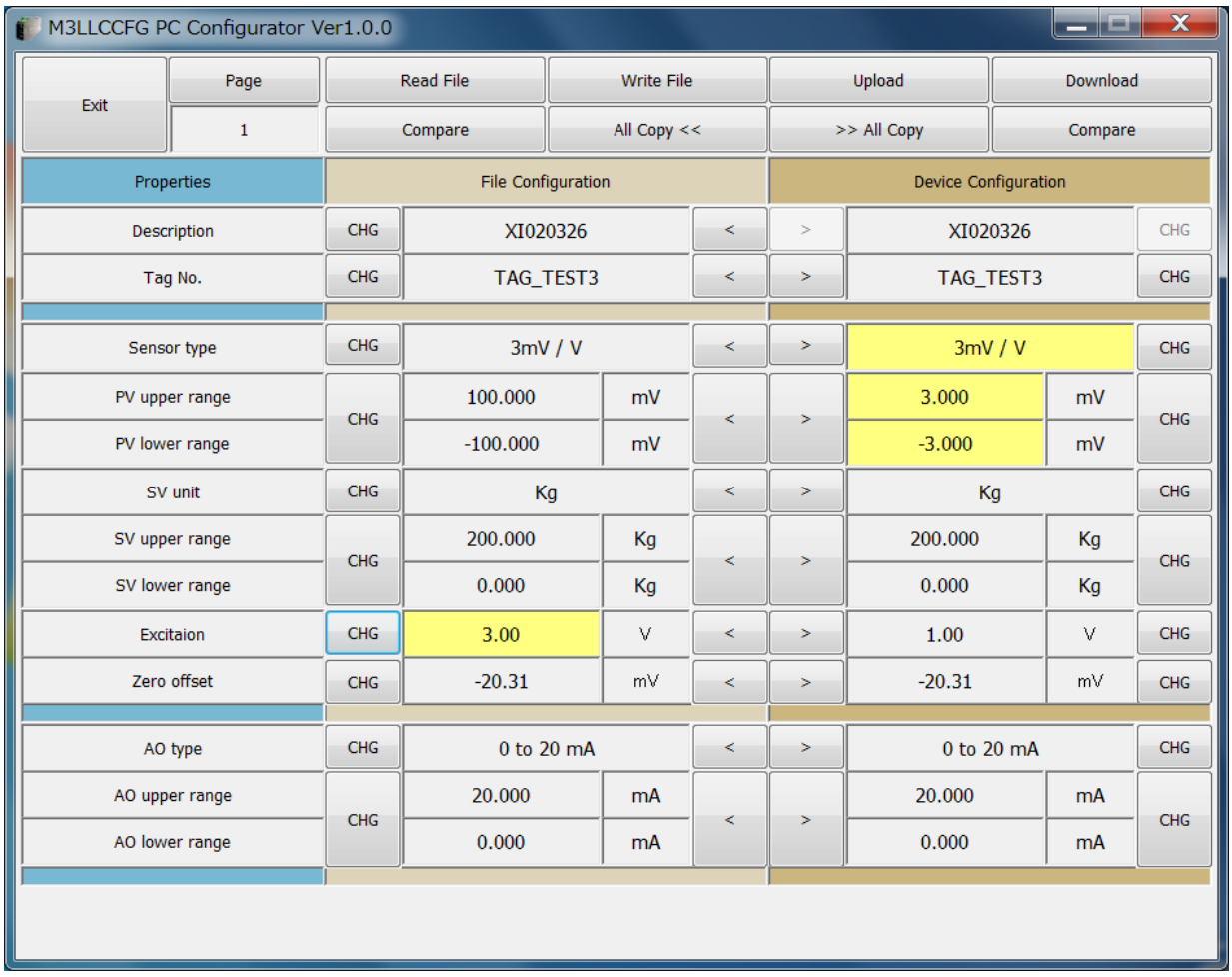
Click [CHG] button at the left of each field to modify the parameter. Fields in which the parameter has been changed will be highlighted in light yellow background color. [CHG] buttons placed across multiple fields indicate that these parameters can be modified in single sequence.

When one parameter has been changed, related fields may be also affected. For example, when 'Sensor type' is modified, 'PV range' may be automatically changed.

Parameters can be copied between 'File Configuration' and 'Device Configuration' using [<] and [>] buttons. Copied fields will be highlighted in light yellow background color.

Using [All Copy <<] or [All Copy >>] buttons enables transferring all parameters between the sections. Copied fields will be highlighted in light yellow background color.

Figure 14. Parameters Modified



6.1.2. TRANSFERRING DATA TO/FROM DEVICE

Click [Upload] button to connect to the device, to read out its configuration data and to show it in 'Device Configuration' section on the screen (Figure 15). All background colors are back to the initial state.

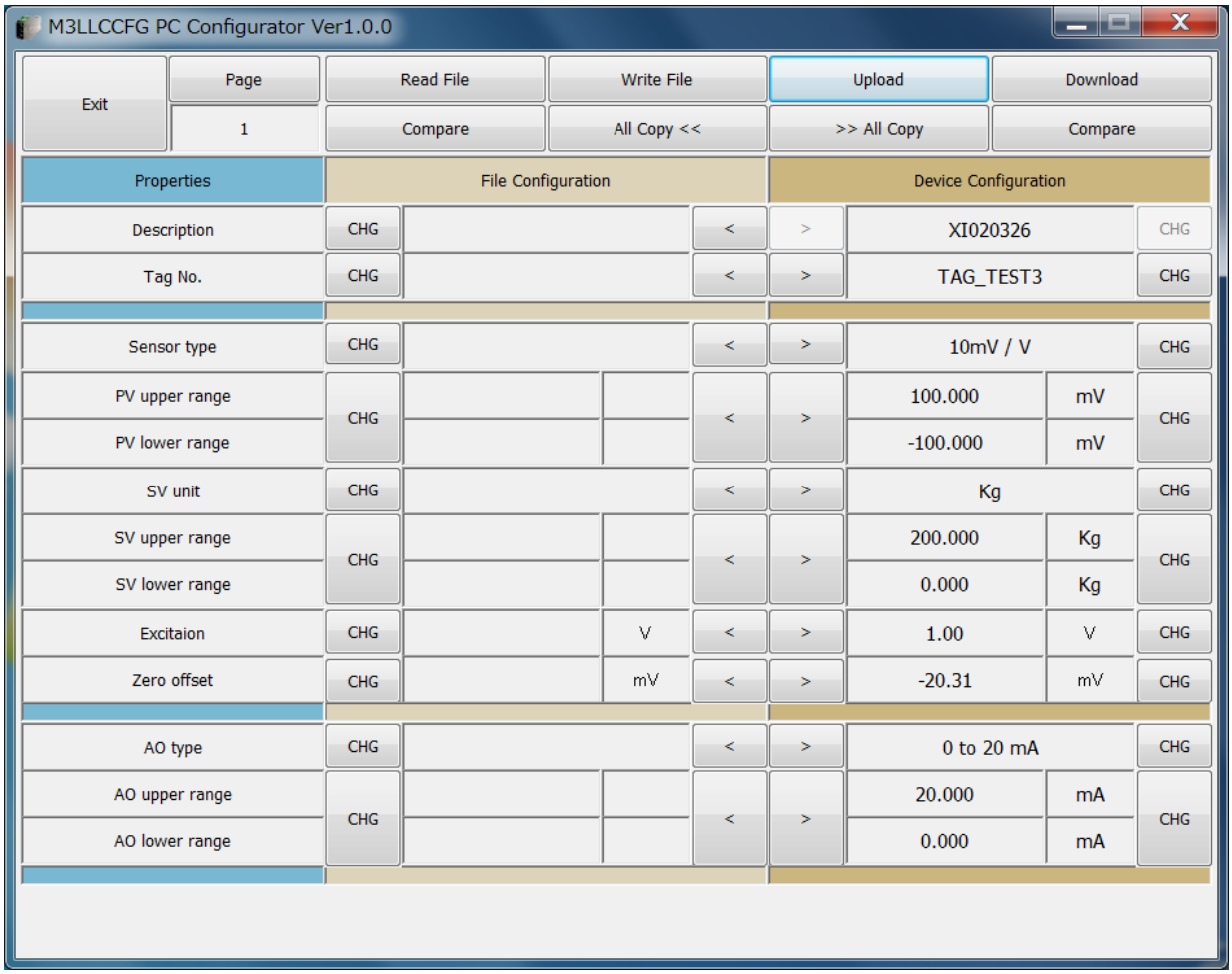
'Description' indicates the serial number of the product, which cannot be modified or copied from 'File Configuration' section.

Click [Download] button to connect and write the configuration data in 'Device Configuration' fields to the device.

If an error occurs and downloading is stopped during the process, erred data field is highlighted in medium pale red background color.

When the downloading is successfully complete, the configuration data is automatically uploaded and the background color returns to the initial state.

Figure 15. Data Uploaded, first page



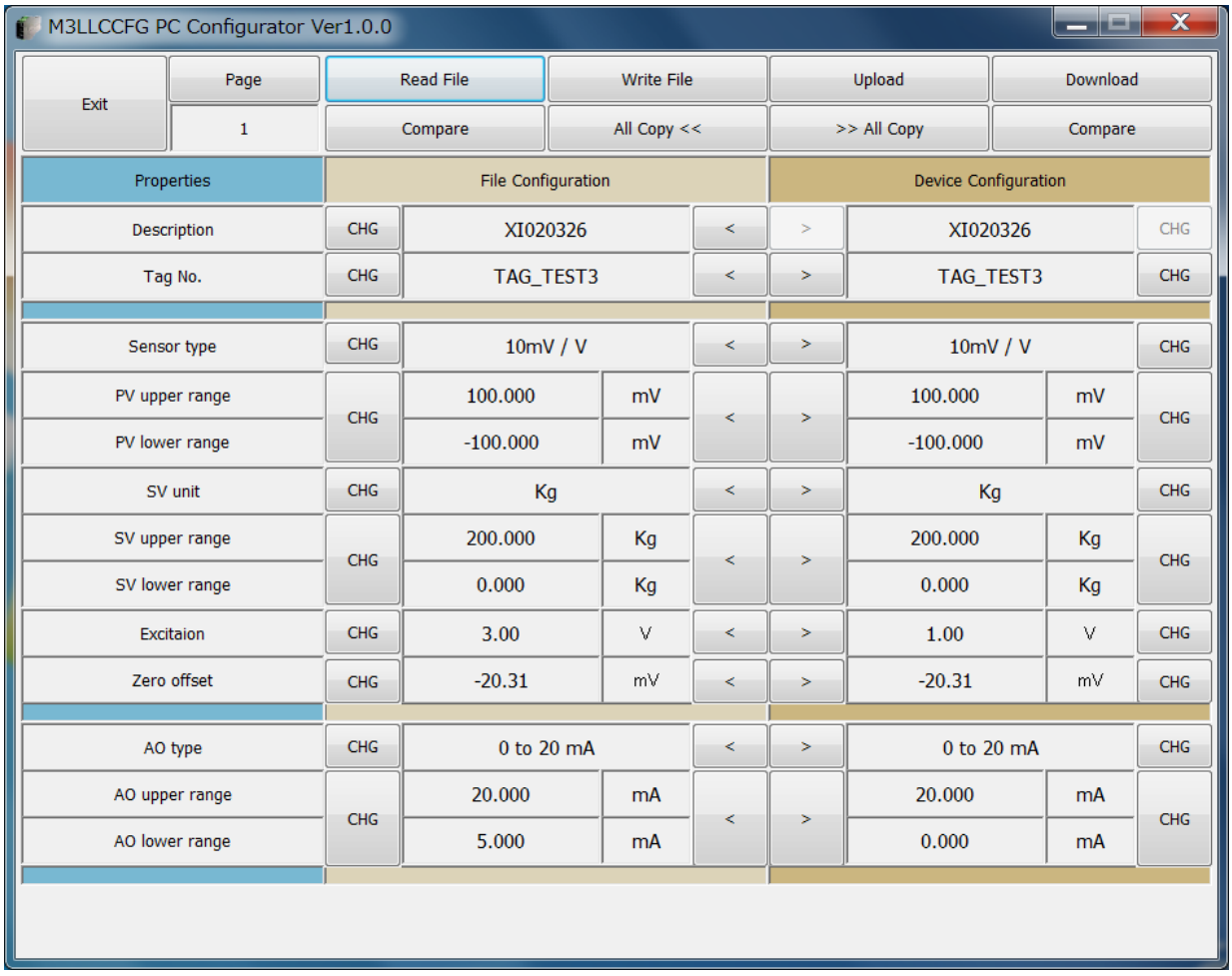
6.1.3. READING/WRITING FILES

Click [Read File] button to read the configuration data from a specified file and to show it in 'File Configuration' section on the screen (Figure 16). All background colors are back to the initial state.

Click [Write File] button to write the configuration data in 'File Configuration' section to a specified file.

A comment (max. 64 alphanumeric characters) can be entered in 'Description' in 'File Configuration' section, which is saved in a configuration file. It cannot be written in the device. When a setting is uploaded from the device, the relevant field in 'Device Configuration' section shows the device's serial number.

Figure 16. File Read Out



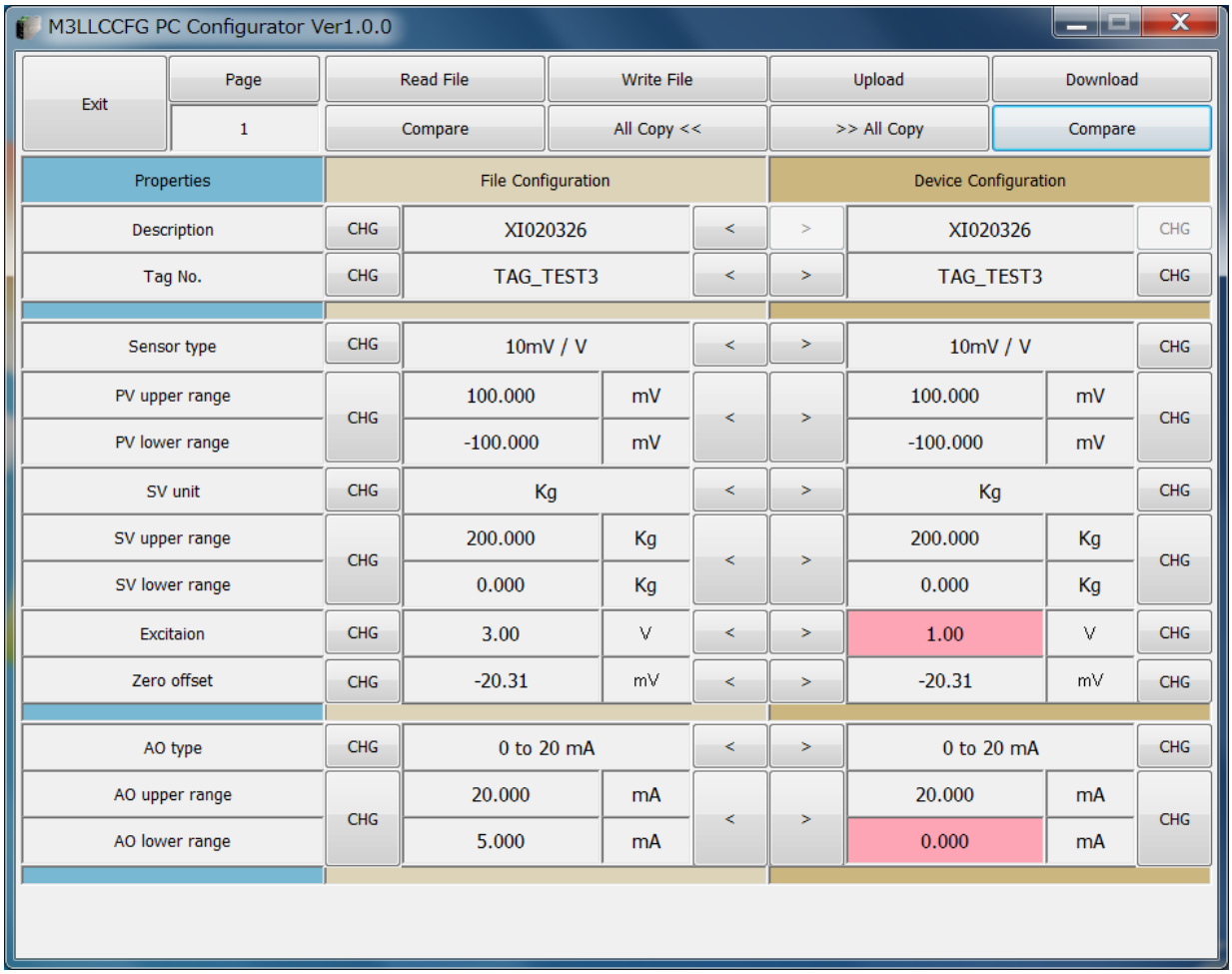
6.1.4. COMPARING FILE TO DEVICE

You can compare the configuration data in ‘File Configuration’ fields and ‘Device Configuration’ fields.

Click [Compare] button in ‘Device Configuration’ fields to compare its data to those in ‘File Configuration’ fields. Deviations will be highlighted in medium pale red background color (Figure 17).

Click [Compare] button in ‘File Configuration’ fields to compare its data to those in ‘Device Configuration’ fields. Deviations will be highlighted in medium pale red background color.

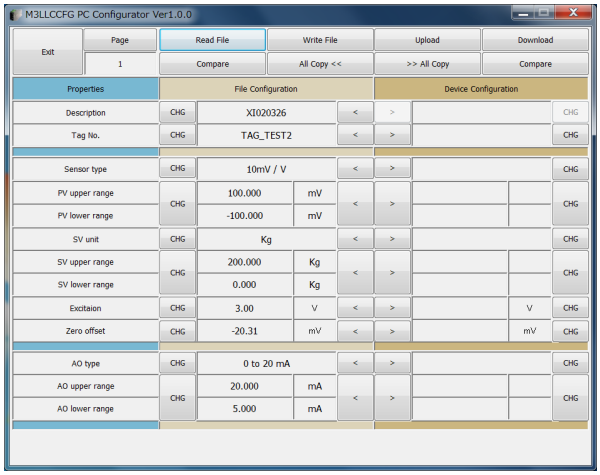
Figure 17. Parameters Compared



6.1.5. OPERATION EXAMPLE BY FILE MANAGEMENT

Operation procedure to change the configuration of the device with file management.

(1) Click [Read File] button to read the configuration data from a specified file



(2) Click [Upload] button to connect to the device and read out its configuration data.

(3) Click [Compare] button in 'File Configuration' fields to compare the data in the file and the data in the device. Deviations will be highlighted in medium pale red background color.

(4) Parameter can be copied from ‘File Configuration’ to ‘Device Configuration’ using [>] button. Copied fields will be highlighted in light yellow background color.

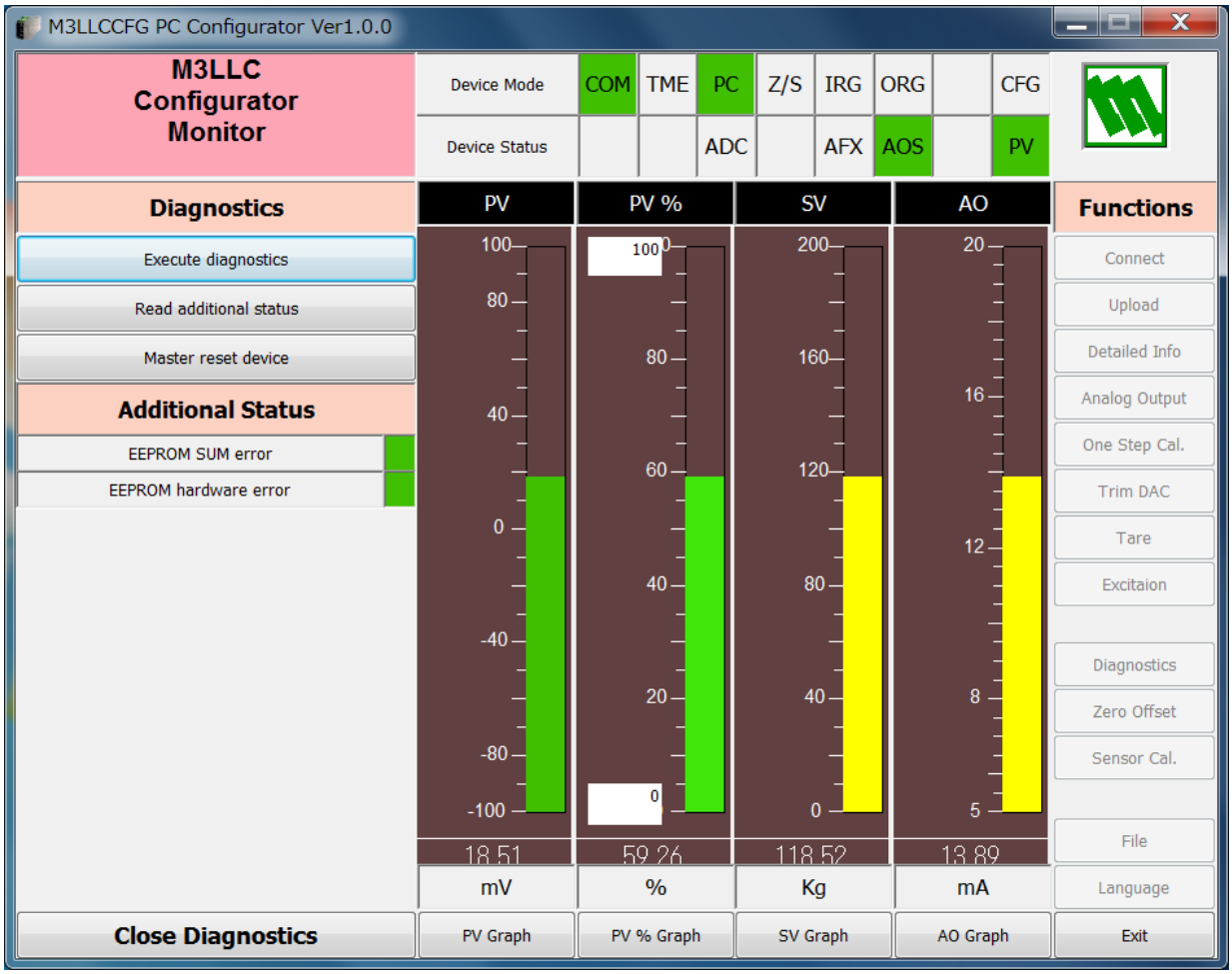
(5) Click [CHG] button at the right of each field to modify the parameter. Fields in which the parameter has been changed will be highlighted in light yellow background color.

(6) Click [Download] button to write the configuration data in ‘Device Configuration’ fields to the connected device. When the downloading is successfully complete, the configuration data is automatically uploaded and the background color returns to the initial state.

7. DIAGNOSTICS

Click [Diagnostics] button to open the Diagnostics window as shown in Figure 18.

Figure 18. Diagnostics

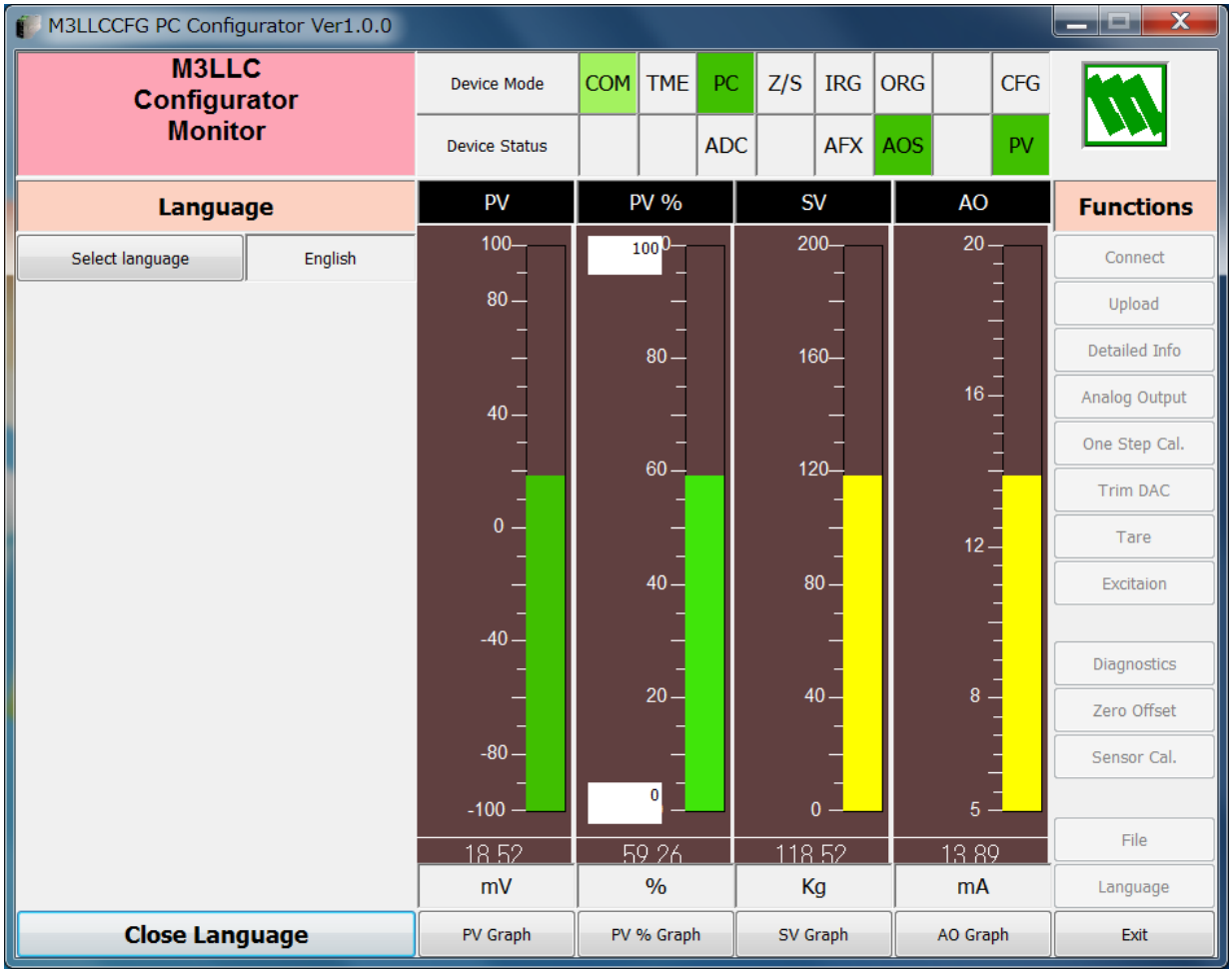


Execute diagnostics		Activates a diagnostics program and results are displayed in Additional Status.
Read additional status		Reads current contents of Additional Status from the device.
Master reset device		Resets and restarts the device without actually turning OFF/ON the power supply.
Additional Status	EEPROM SUM error	Status is displayed: green in normal status, while red in error.
	EEPROM hardware error	
Close Diagnostics		Close the window.

8. LANGUAGE

Click [Language] button to open the Language window as shown in Figure 19. The user can select the display language of the M3LLCCFG.

Figure 19. Language



Click [Select language] to select the available language. The selected language is shown on the screen immediately.

English is available in each language version of Windows, while Windows in your PC must support other language in order to display it.

Click [Close Language] to close the window.