

Model FRC Universal Temperature Transmitter

PC CONFIGURATOR

Model: FRCCFG

Users Manual

 **M·SYSTEM CO.,LTD.**

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1. GETTING STARTED

1.1 PC REQUIREMENTS

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

PC	IBM PC compatible
OS	Windows XP Service Pack 3 Windows Vista (32 bit) Service Pack 1 Windows 7 (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
Cable	HART modem cable (M-System model: COP-HU)

1.2 INSTALLING THE FRCCFG

(1) Start up Windows.

(2) Insert FRCCFG Setup CD-ROM into the CD drive on your PC. The Setup program automatically starts and shows the setup dialog box on the screen.

⚠ If the program does not automatically start, install manually by starting up Disk:\Setup.exe.

(3) Choose "FRCCFG."

→ Windows starts the installation program for the FRCCFG software.

→ Follow instructions on the screen and click Next.

→ Click Close.

(4) Click Exit and exit the installation program.

Now the FRCCFG program has been installed.

1.3 STARTING UP THE FRCCFG

Connect the model FRC Universal Temperature Transmitter to the PC via HART modem cable.

Press Start on the task bar and choose FRCCFG from Program menu.

2. MODEL FRC GENERAL DESCRIPTION

INPUT TYPES

The FRC supports three types of input signals/sensors: DC millivolts, thermocouple and RTD.

BURNOUT

Broken wire detection (Burnout) function can be enabled or disabled. When enabled, the FRC applies an excitation voltage for a very short time period. The PV at burnout is not assured, and the output is according to the preset alarm action.

COLD JUNCTION COMPENSATION

For thermocouple inputs, the FRC supports Internal CJC, External CJC, Constant (value) and no compensation.

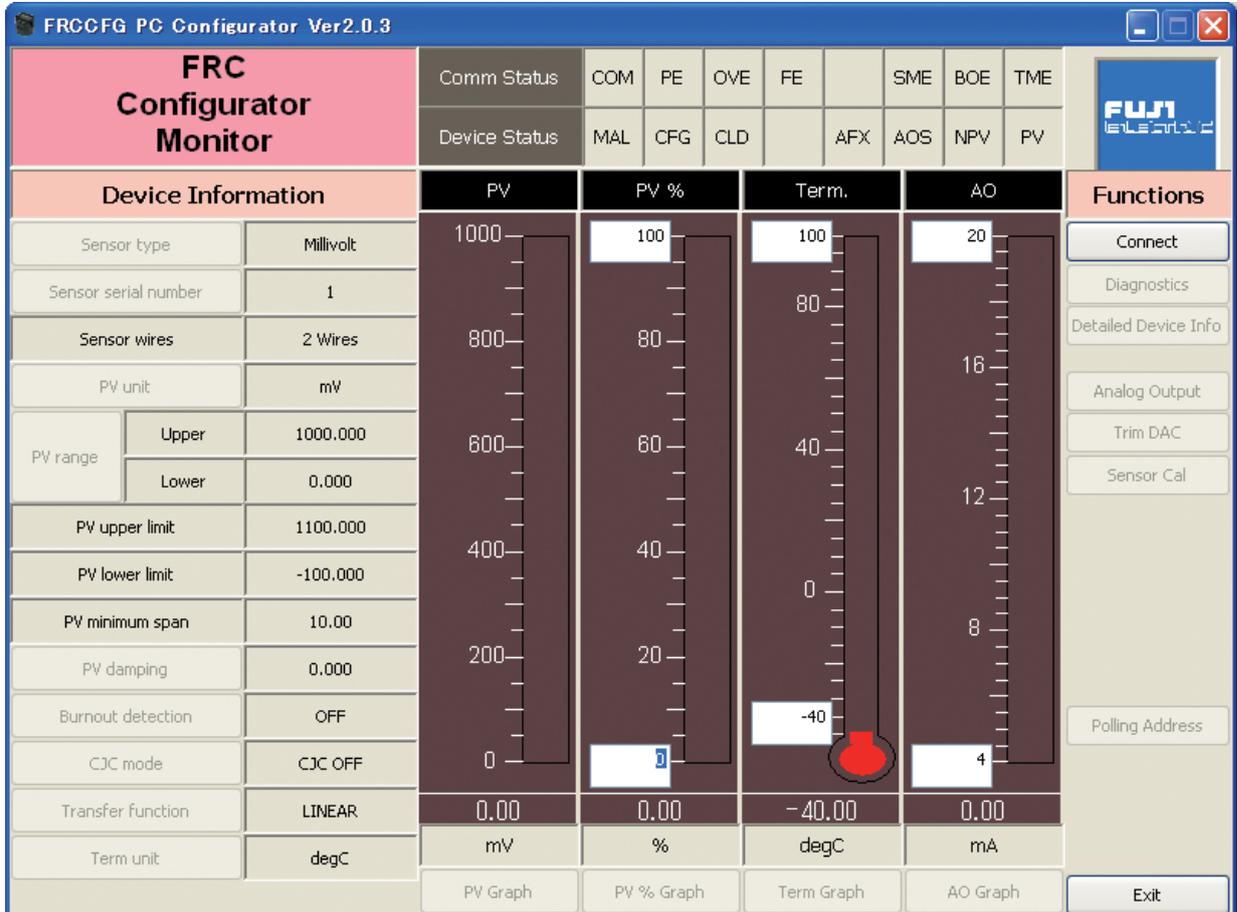
- **Internal CJC:** The FRC uses an internal temperature sensor attached to the terminal.
- **External CJC:** A Pt 100 sensor attached externally is used.
- **Constant:** A specific value is used as reference temperature.

3. OPERATING THE FRCCFG PC CONFIGURATOR

Figure 1 shows the initial view of the FRCCFG PC Configurator window.

In order to enable tools shown on the screen, the model FRC Universal Temperature Transmitter must be connected to the PC via a HART modem.

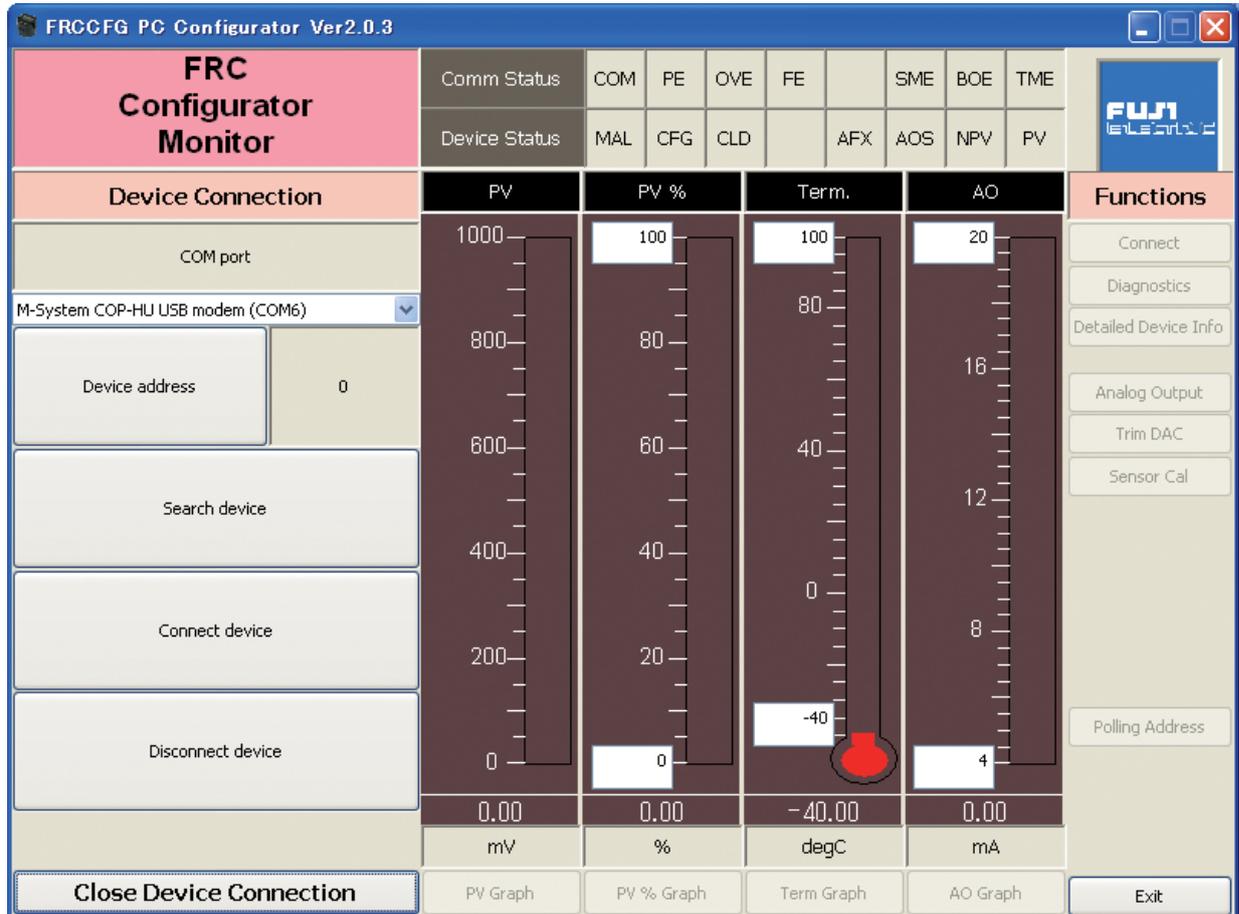
Figure 1. Initial View



3.1 CONNECTING THE DEVICE (FRC)

On the initial view, 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.
Device address	Specify polling address of the device to be connected.
Search device	Searches connected devices among the ones whose polling address is already set between 0 and 15. Starts at the address specified in 'device address' field.
Connect device	Connects the device of which polling address is specified in the device address. Once the connection is established, the program uploads the device's configuration information and automatically opens the Device Information view. The view is the base for various operations to configure the FRC.
Disconnect device	Disconnects the currently connected device.
Close Device Connection	Quits the Device Connection view.

3.2 MONITORING TRENDS

Once the device is connected, the Device Information menu and the trend monitors appears on the screen. The user can configure various parameters of the FRC.

Figure 3. Device Information



3.2.1 COMMUNICATION STATUS

Comm Status summarizes current communications status by lamps showing the communication status byte contents in HART commands.

[COM] lamp	Blinks with the normal communications condition.
[PE] lamp	Red light turns on when the device detects Parity Error.
[OVE] lamp	Red light turns on when the device detects Overrun Error.
[FE] lamp	Red light turns on when the device detects Framing Error.
[SME] lamp	Red light turns on when the device detects Sum Check Error.
[BOE] lamp	Red light turns on when the device detects Buffer Over Flow Error.
[TME] lamp	Red light turns on when the device detects the communications time out.

3.2.2 DEVICE STATUS

Device Status summarizes current device status by lamps showing the device status byte contents in HART commands.

[MAL] lamp	Red light turns on when malfunction(s) occur(s) in the device such as below. <ul style="list-style-type: none"> · Wire break detected · ADC module malfunction · CJC sensor error (T/C input in internal or external CJC mode)
[CFG] lamp	Red light turns on when the device configuration is modified. This lamp can be turned off by [Reset configuration change flag] in the Diagnostics view.
[CLD] lamp	Always OFF with the FRC.
[AFX] lamp	Red light turns on when the analog output entered in fixed output mode. Fixed output mode is initiated by one or more of the following conditions: <ul style="list-style-type: none"> · Fixed output mode initiated by the application · Analog output saturated · Alarm output is provided, caused by malfunction status · Polling address between 1 and 15 is set
[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.
[NPV] lamp	Green light turns on when the CJC sensor terminal is within normal temperature range (-50 to 100°C). Red light turns on when it is out of the range.
[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.

3.2.3 BARGRAPH & TREND GRAPH

Four bargraphs indicating PV in engineering unit, PV in % of the selected range, the terminal temperature and analog output current are available. When 'External CJC' is selected, the terminal temperature shows that of the external terminals. Otherwise it shows temperature of the internal terminals.

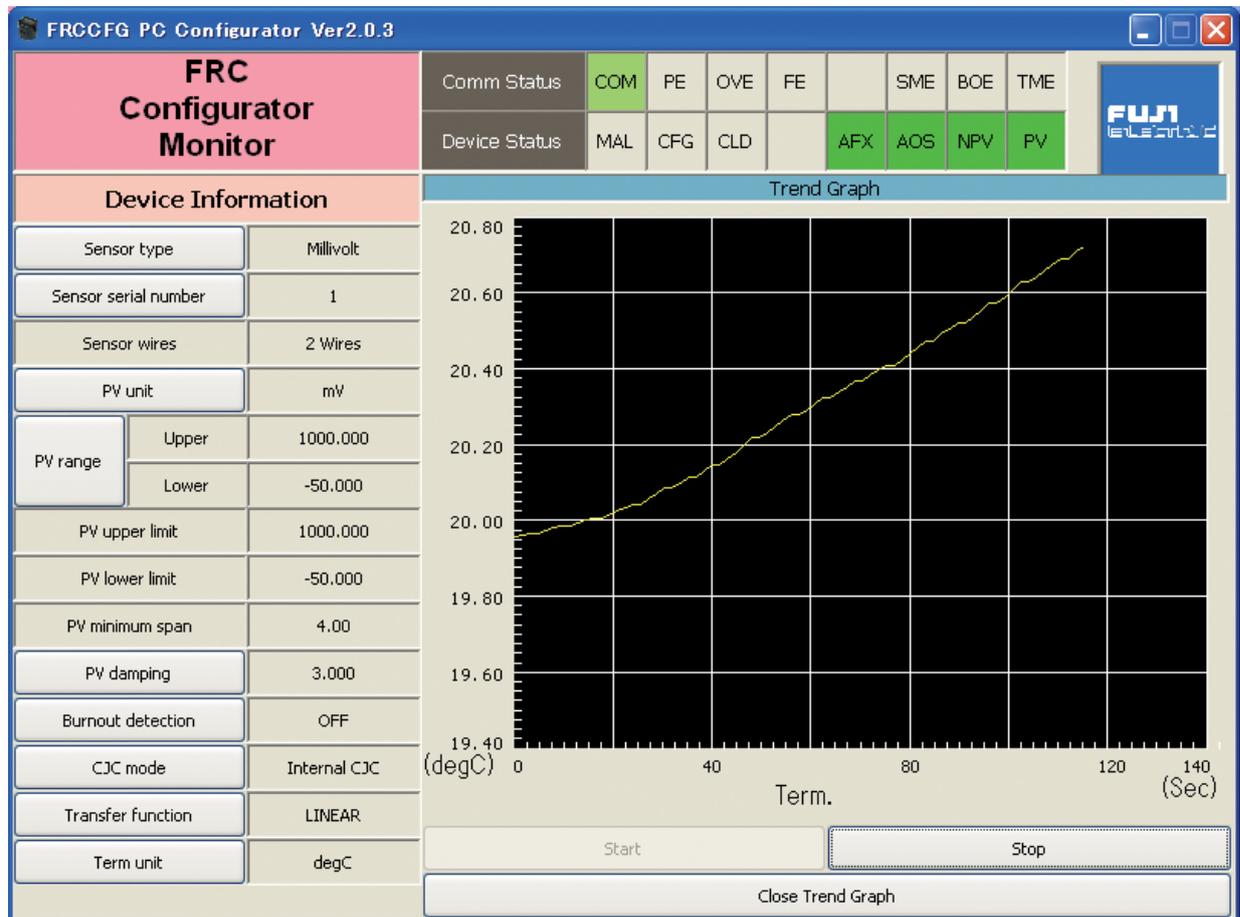
Graph scales can be modified except for the PV in engineering unit of which the scales are automatically determined and fixed according to the selected range.

At the bottom of each bargraph is [Graph] button which opens a trend graph for the parameter. The example below shows the trend graph for [Term Graph]. Use [Start] and [Stop] buttons to activate/deactivate trending, and click [Close] to quit the graph view.

Note

The unit of X-axis is second and 6-figure number is the maximum. Numbers with more than 6-figure may be partially not shown.

Figure 4. Trend Graph



3.3 DEVICE CONFIGURATION

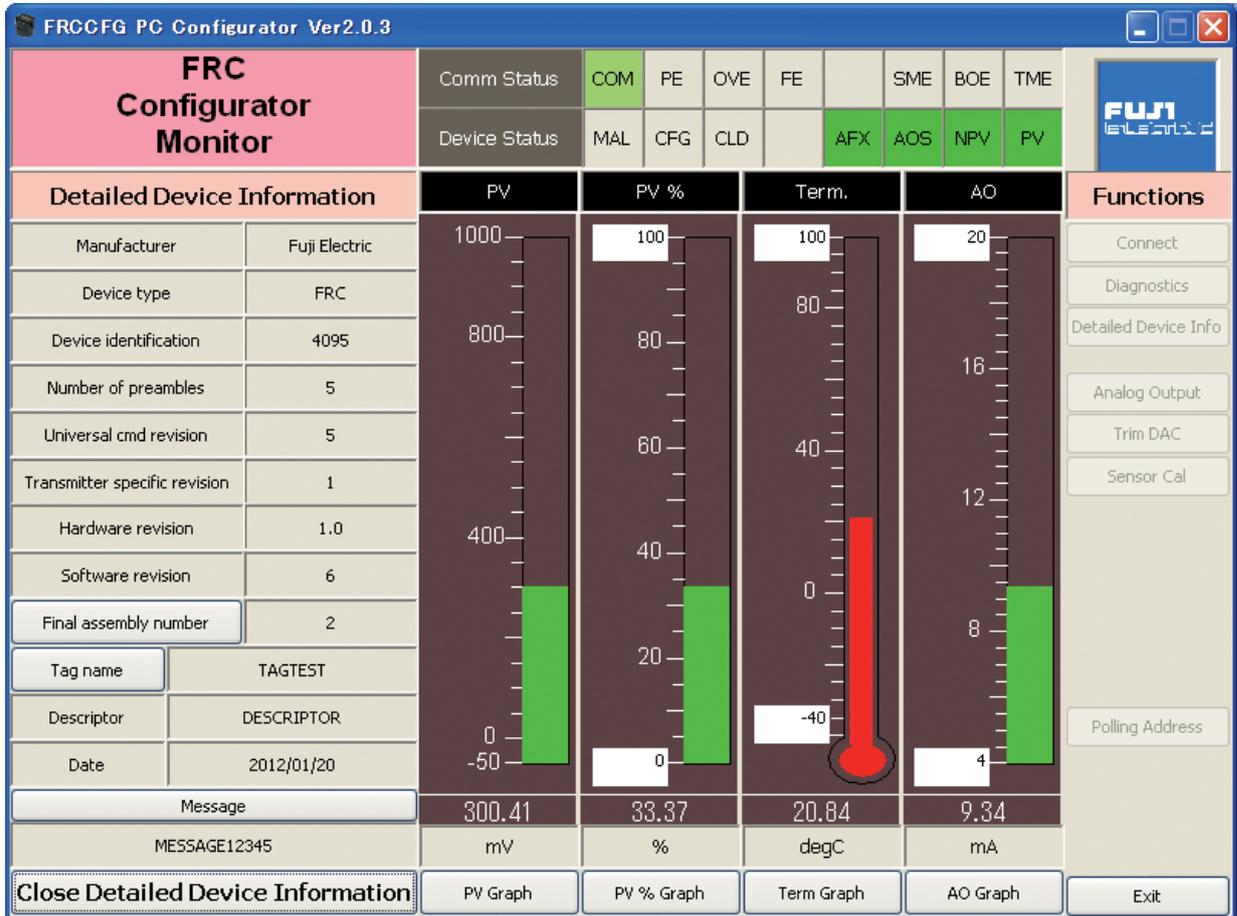
In Figure 3, the Device Information menu on the left shows basic configuration information of the connected device. When you need to change configurations, click the left button for the required parameter to modify its setting.

Sensor type	Specifies sensor type, measurement type and number of extension wires (sensor wires). When a new sensor type is chosen, other default settings are automatically selected.
PV unit	Specifies engineering unit for the PV. When this setting is changed, other related parameters such as PV range, upper/lower limits, PV minimum span are automatically shown in the new unit.
PV range	An appropriate range is automatically set except for the difference measuring.
PV damping	Specifies time constant (0.5 to 30 seconds) for damping function. Set to 0 to cancel the function.
Burnout detection	Enables/disables burnout (wire break) function.
CJC mode	Enables/disables and choose type of cold junction compensation for thermocouple input. When a thermocouple is specified as the input sensor, the CJC mode is set to 'Internal CJC' at default.

3.4 DETAILED INFORMATION

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

Figure 5. Detailed Device Information



The menu shows the following parameters: Manufacturer, Device type, Device identification, Number of preambles, Universal command revision, Transmitter specific revision, Hardware revision, Software revision, Final assembly number, Tag name, Descriptor, Date and Message.

Final assembly number	You can enter a final assembly number.
Tag name	You can enter a tag name and its description (Descriptor). Date is automatically set with the data modified date. Max. 8 alphanumeric characters for the tag, max. 16 alphanumeric characters for the descriptor.
Message	You can enter a memo in this field. Up to 32 alphanumeric characters.
Close Detailed Device Information	Quits the view.

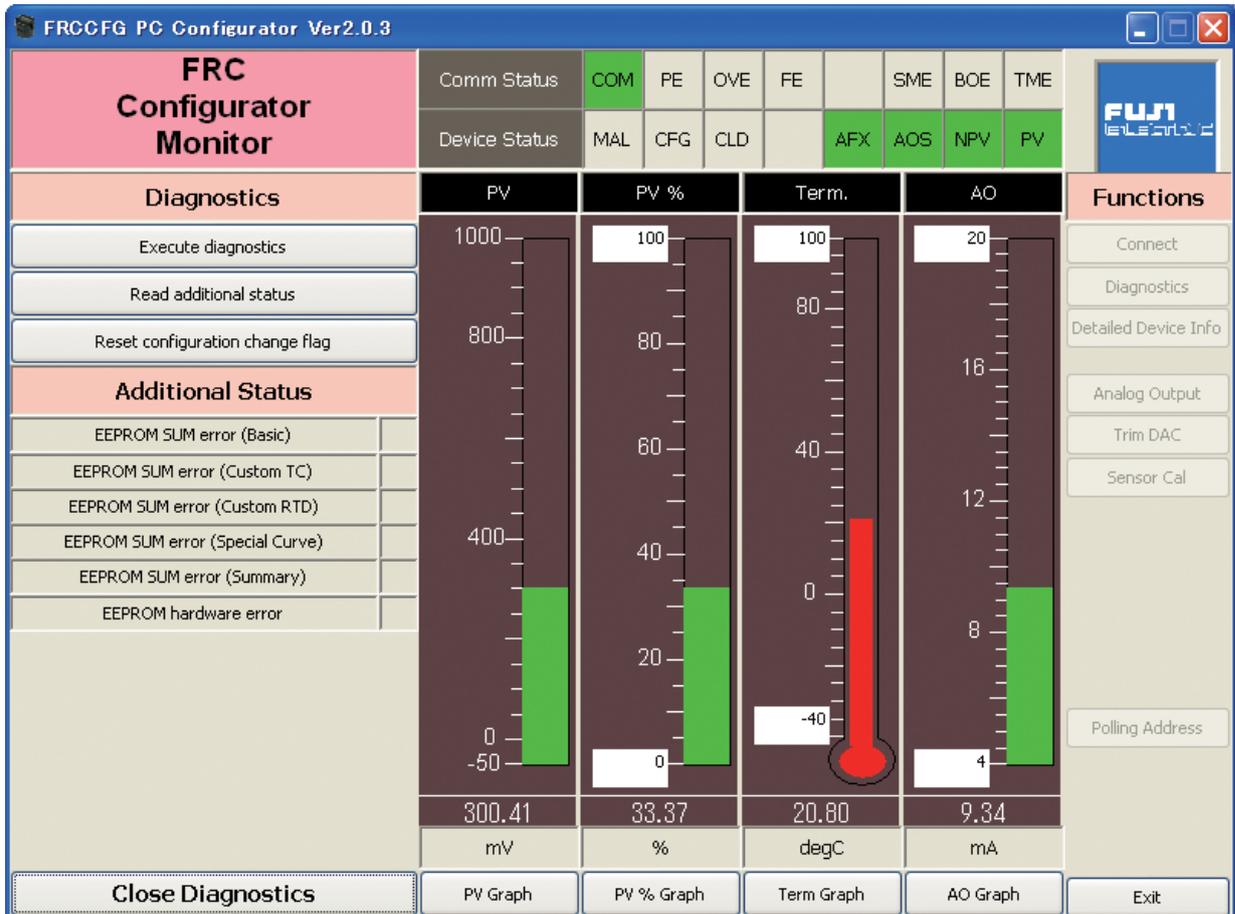
Note

Only capital letters are used as 'Tag name', 'Descriptor' and 'Message.' Small letters will be automatically converted to capital letters.

3.5 DIAGNOSTICS

Click [Diagnostics] button to open the Diagnostics view as shown in Figure 6.

Figure 6. Diagnostics

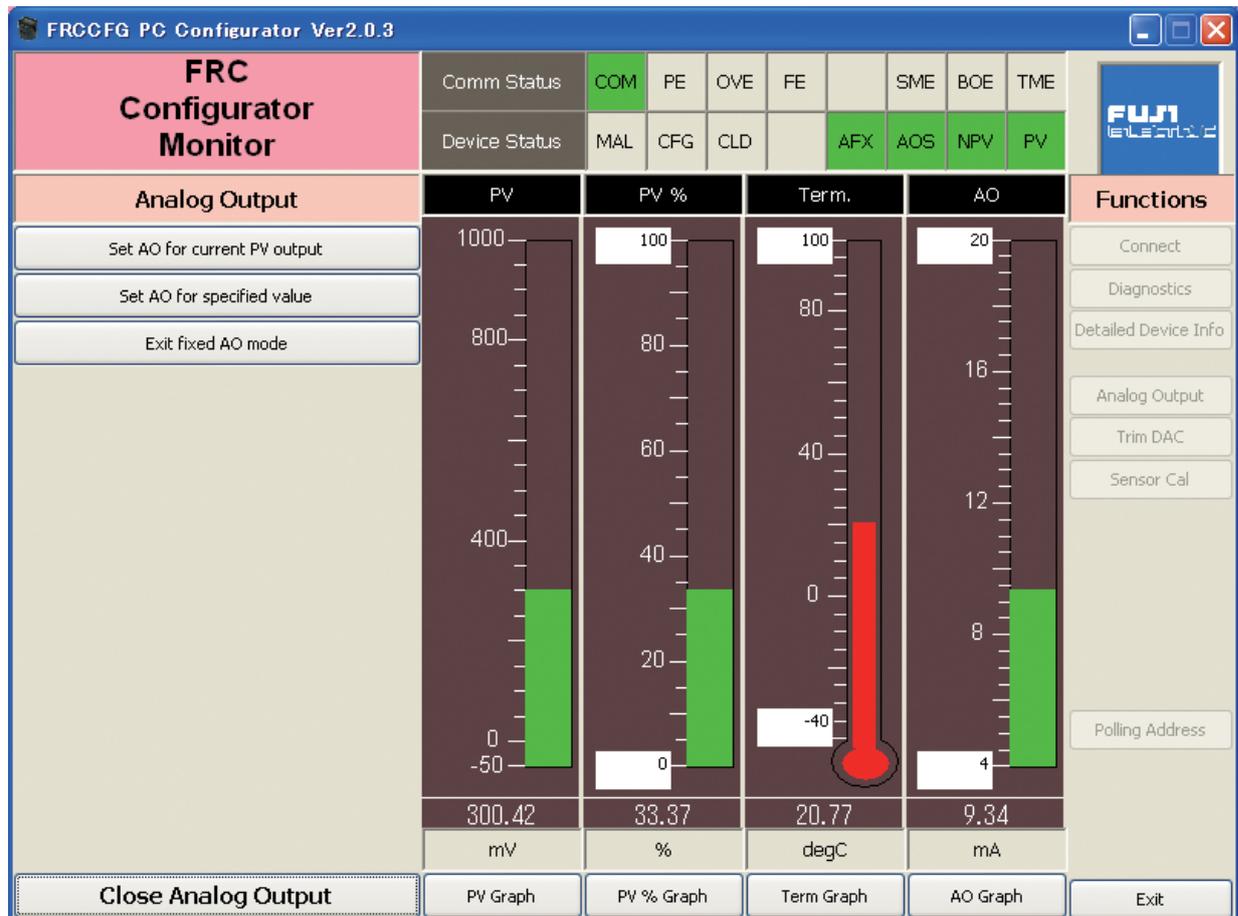


Reset configuration change flag	Turns off the CFG lamp in Device Status. The red CFG lamp is automatically turned on whenever configurations are changed, and remains on unless it is manually reset using this button.
Execute diagnostics	Activates a diagnostics program and results are displayed in Additional Status (Figure 6). The section shows each Additional Status parameter and its status: green in normal status, while red in error.
Read additional status	Reads current contents of Additional Status.
Close Diagnostics	Quits the view.

3.6 FIXED ANALOG OUTPUT

Click [Analog Output] button to open the Analog Output view as shown in Figure 7.

Figure 7. Analog Output



Set AO for current PV output	The output current is held at the current value.
Set AO for specified value	You can set a specific fixed value for the output.
Exit fixed AO mode	Cancel the fixed output mode to return the device into normal output mode. It is recommended to fix the analog output signal while those parameters affecting the output signal are configured, and then to reset the device to normal mode after the setting is complete.
Close Analog Output	Quits the view.

3.7 DAC TRIMMING

Click [Trim DAC] button to open the Trim DAC view as shown in Figure 8.

Figure 8. Trim DAC



3.7.1 ENTER 4mA TRIM MODE

- (1) Click [Enter 4mA trim mode]. The device outputs a fixed 4mA signal.
- (2) Measure actual output current at the receiving instrument to which the device output should be matched.
- (3) Click [Trim by actual measured value] to set the measured value. The actual value can be set from 3.8mA up to 4.2mA.
- (4) Repeat setting [Trim by actual measured value] until the measured output shows 4mA.

3.7.2 ENTER 20mA TRIM MODE

- (1) Click [Enter 20mA trim mode]. The device outputs a fixed 20mA signal.
- (2) Measure actual output current at the receiving instrument to which the device output should be matched.
- (3) Click [Trim by actual measured value] to set the measured value. The actual value can be set from 19.8mA up to 20.2mA.
- (4) Repeat setting [Trim by actual measured value] until the measured output shows 20mA.

3.7.3 RESETTING TO THE DEFAULT

Click [Clear trim DAC data] to return the device to the factory default trimming values.

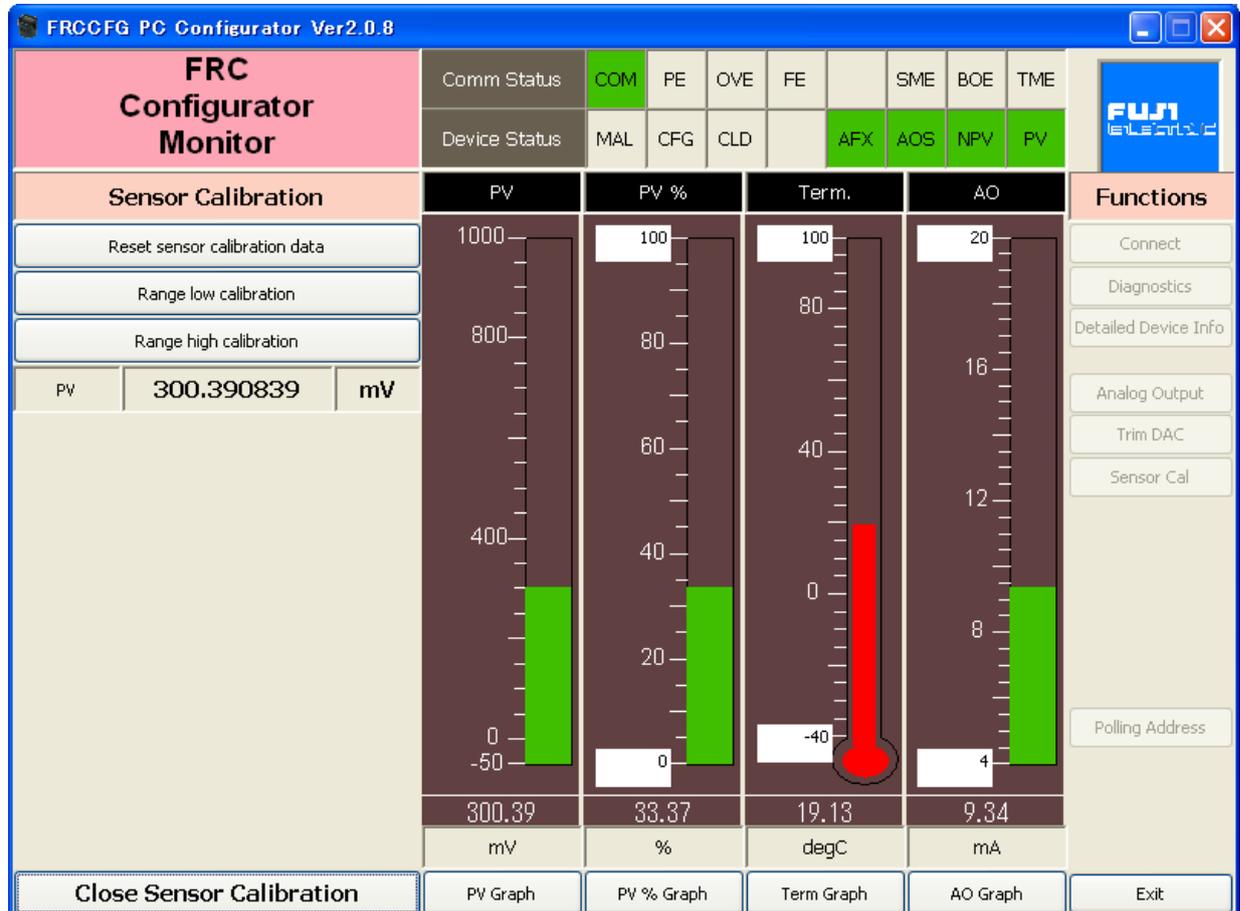
[Close Trim DAC] quits the view.

3.8 SENSOR CALIBRATION

Input values from the sensor can be finely calibrated with “two-point calibration” that calibrates at “low calibration point” and “high calibration point.” The method can calibrate the mV and thermocouple input against the measured voltage, while the RTD input is against the measured resistance. Since the engineering unit of PV can be used for the calibration, it is easy to calibrate.

Click [Sensor Cal] button to open the Sensor Calibration view as shown in Figure 9.

Figure 9. Sensor Calibration



The present measured value with many decimal places is indicated in the PV column. The value is in PV unit and updated in every 0.5 seconds. Refer to this value when calibrating the sensor. It takes a few seconds for the calibration result affects the measured value on the display.

Click [Range Low Calibration] and set the low target value of “two-point calibration.” Then the lower PV is calibrated.

Click [Range High Calibration] and set the high target value of “two-point calibration.” Then the higher PV is calibrated.

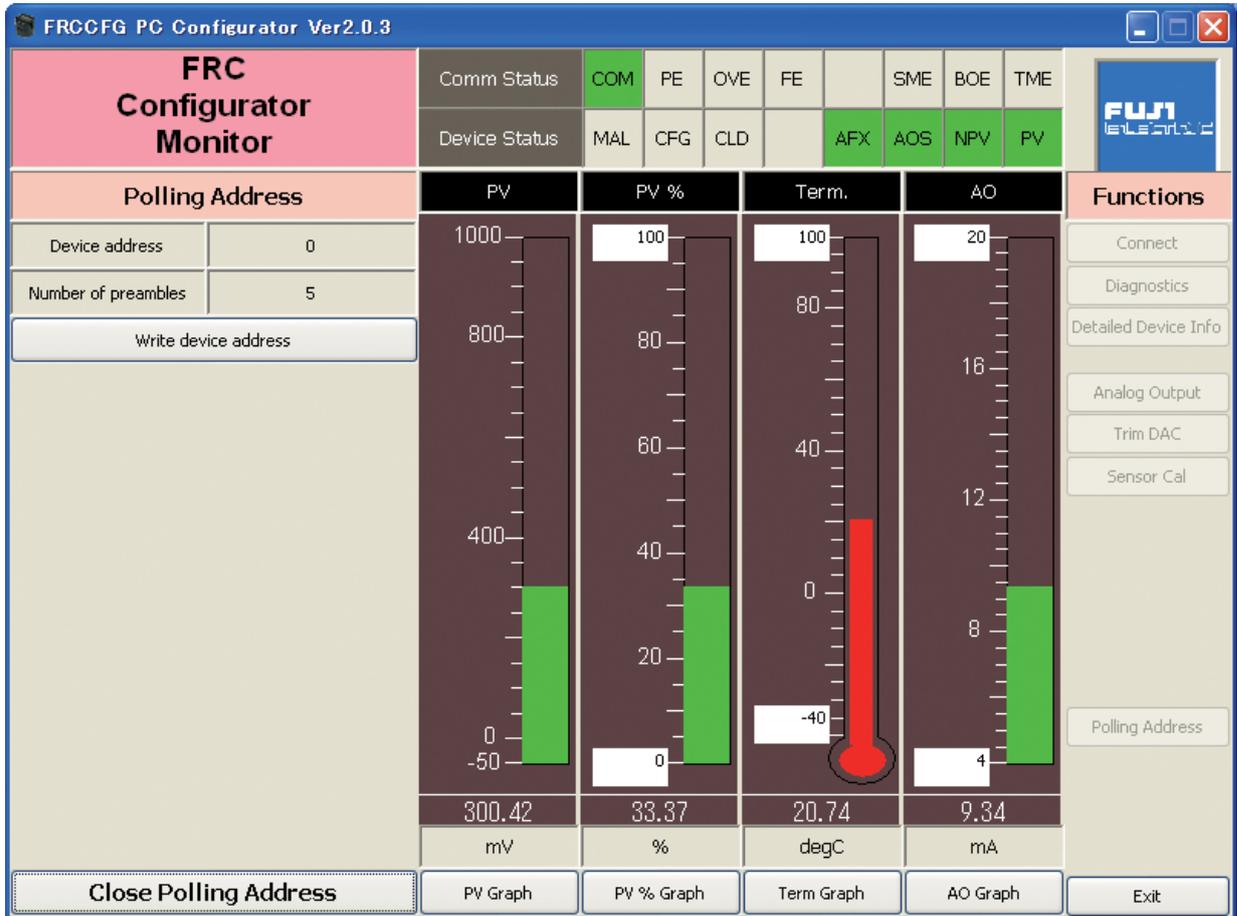
In order to clear the calibration data and set to the factory default data, click [Reset Sensor Calibration Data].

[Close Sensor Calibration] quits the view.

3.9 POLLING ADDRESS

Click [Polling Address] button to open the Device Address view as shown in Figure 10.

Figure 10. Polling Address



Device address	Shows the polling address of currently connected device.
Write device address	Write to the device a new polling address. Selectable addresses are from 0 to 15. The output current is fixed to 4mA, and [Analog Output] or [Trim DAC] functions become unavailable.
Number of preamble	Shows number of preamble at HART communication. Not rewritable.
Close Polling Address	Quits the Polling Address view.

M-SYSTEM WARRANTY

1. What is covered.

M-System Co., Ltd. ("M-System") warrants, only to the original purchaser of new M-System products purchased directly from M-System, or from M-System's authorized distributors or resellers, for its own use not for resale, that the M-System products shall be free from defects in materials and workmanship and shall conform to the specifications set forth in the product catalogue applicable to the M-System products for the Warranty Period (see Paragraph 5 below for the Warranty Period of each product).

THE ABOVE WARRANTY IS THE ONLY WARRANTY APPLICABLE TO THE M-SYSTEM PRODUCTS AND IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, ALL IMPLIED WARRANTIES OF MERCHANTABILITY OR OF FITNESS FOR A PARTICULAR PURPOSE.

2. What is not covered.

This warranty does not cover any M-System product which has been: (1) modified, altered or subjected to abuse, misuse, negligence or accident; (2) improperly installed or installed in conjunction with any equipment for which it was not designed; or (3) damaged or destroyed by disasters such as fire, flood, lightning or earthquake.

In no event shall M-System be liable for any special, incidental, consequential or other damages, costs or expenses (including, but not limited to, loss of time, loss of profits, inconvenience or loss of use of any equipment).

3. Remedies.

If a defective product is returned to M-System in accordance with the procedures described below, M-System will, at its sole option and expense, either: (1) repair the defective product; (2) replace the defective product; or (3) refund the purchase price for the defective product paid by the purchaser. Except as otherwise provided by applicable state law, these remedies constitute the purchaser's sole and exclusive remedies and M-System's sole and exclusive obligation under this warranty.

4. Warranty Procedure.

If the purchaser discovers a failure of the M-System products to conform to the terms of this warranty within the Warranty Period, the purchaser must promptly (and, in any event not more than 30 days after the discovery of such failure) notify the relevant party as described below either by telephone or in writing at the below address to obtain an Authorized Return (AR) number and return the defective product to the relevant party. The designated AR number should be marked on the outside of the return package and on all correspondence related to the defective product. The purchaser shall return, at purchaser's expense, defective products only upon receiving an AR number. In order to avoid processing delays, the purchaser must include: copies of the original purchase order and sales invoice; the purchaser's name, address and phone number; the model and serial numbers of the returned product; and a detailed description of the alleged defect.

5. Warranty Period.

Signal Conditioner:	36 months from the date of purchase.
M-Rester:	12 months from the date of purchase.
Valve Actuator:	18 months from the date of shipment from M-System or 12 months from the date of its installation, whichever comes first.
Other Products:	36 months from the date of purchase.

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