

# **Field Communication Software CommStaff Model: CFS100**

## **Instruction Manual (Smart Displacement type Level Transmitter SLX Series Edition)**



**Yamatake Corporation**

## NOTICE

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### Instruction Manuals

Safety-related precautions, general operating procedures, and other general information related to CommStaff can be found in the Common Edition manual (No. CM2-CFS100-2001). For information on the operation of a device used with CommStaff, consult the manual for that particular device.

The Common Edition manual for CommStaff, as well as the manuals for individual devices, are included in electronic form (as PDF files) on the CommStaff installation CD-ROM

### Devices Covered by This Manual

This manual pertains to Smart Displacement type Level Transmitter with the model number pattern SLX Series

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# Chapter 1. Overview

## 1-1. Introduction

CommStaff is a tool for communicating with Yamatake smart field devices (DSTJ and others) that enables configuration of device settings. It is a software product that operates on Windows PCs. CommStaff communicates with Yamatake smart field devices using a USB interface connected to a Windows PC, which is then connected by communications cable to the USB port of a device. CommStaff supports Yamatake's proprietary SFN/DE communication protocol \*2 as well as the HART communication protocol.

\*1. HART is a registered trademark of the HART Communication Foundation. \*2. DE output is not supported.

This manual describes how to use the model the SLX Series Smart Displacement type Level Transmitter communications version of CommStaff. For information on the specifications common to all types of devices and information on how to install CommStaff, please refer to the main CommStaff Operation Manual. *Before reading this manual, make sure to read the main CommStaff Operation Manual thoroughly.*

## 1-2. Important Notes

- When changing connected devices

CommStaff continues communicating with the device when displaying dynamic values, such as pressure, so that it can continuously update these values. If you remove the communications cable to change the device during this communication, an error will occur.

Exit CommStaff before detaching the communications cable from the device, and then start CommStaff again after connecting the communications cable to the new device.

- For details on common problems, refer to CM2-CFS100-2001, *Field Communication Software: CommStaff Model: CFS100 (Common Edition) User's Manual*.

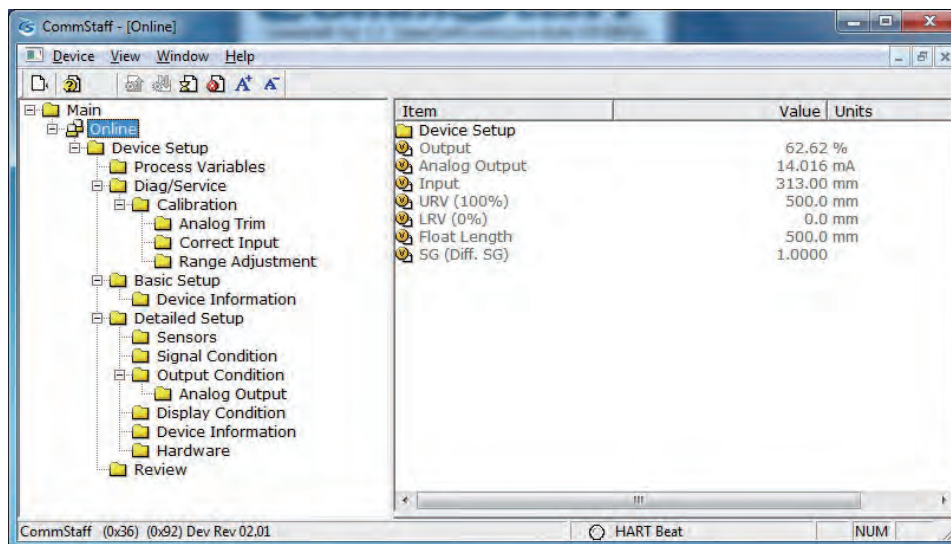
## 1-3. Supported Versions

CommStaff version 1.1 supports the SLX Series Smart Displacement type Level Transmitter with SFN communications version 4.0 or later.

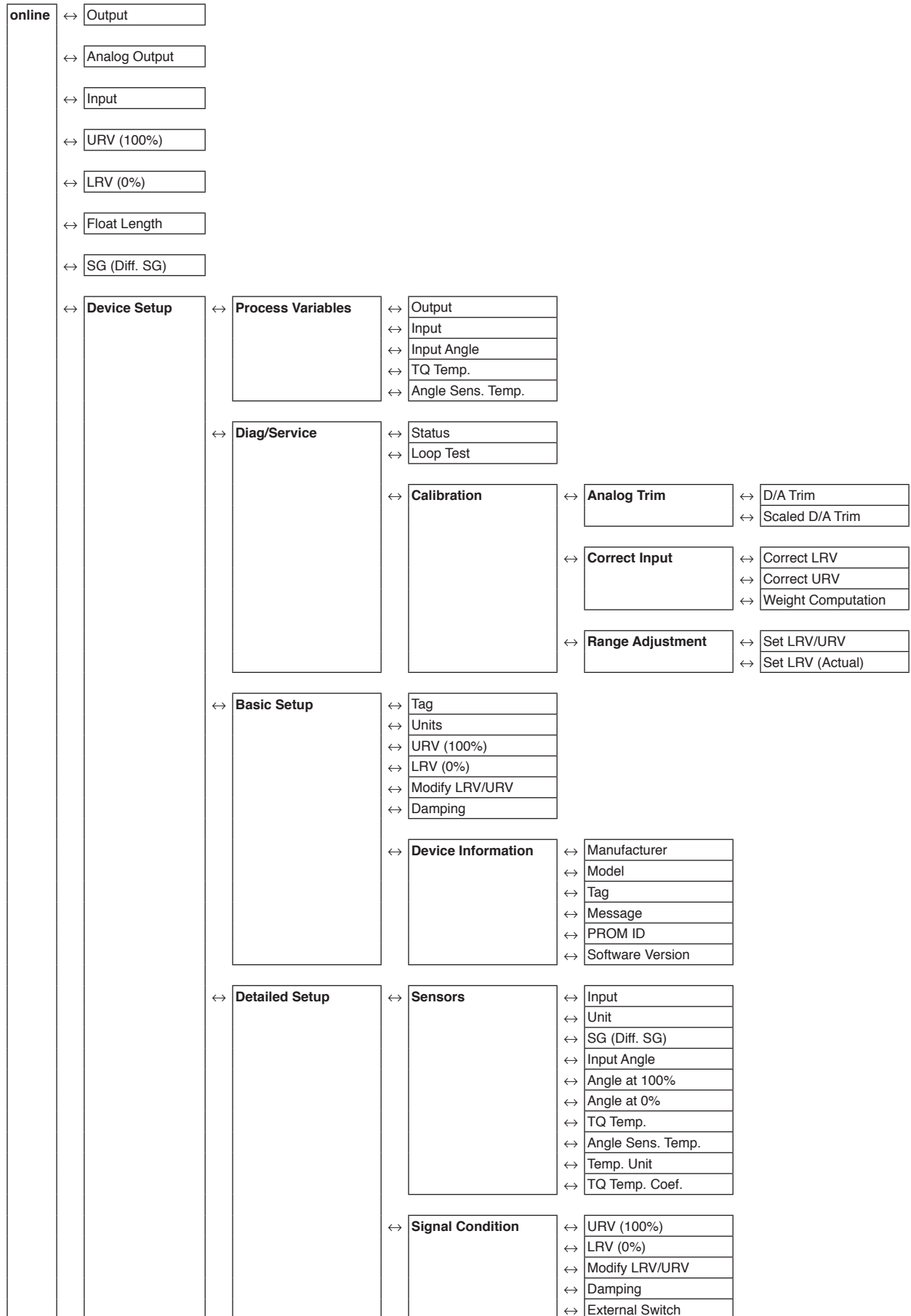
# Chapter 2. Configuration

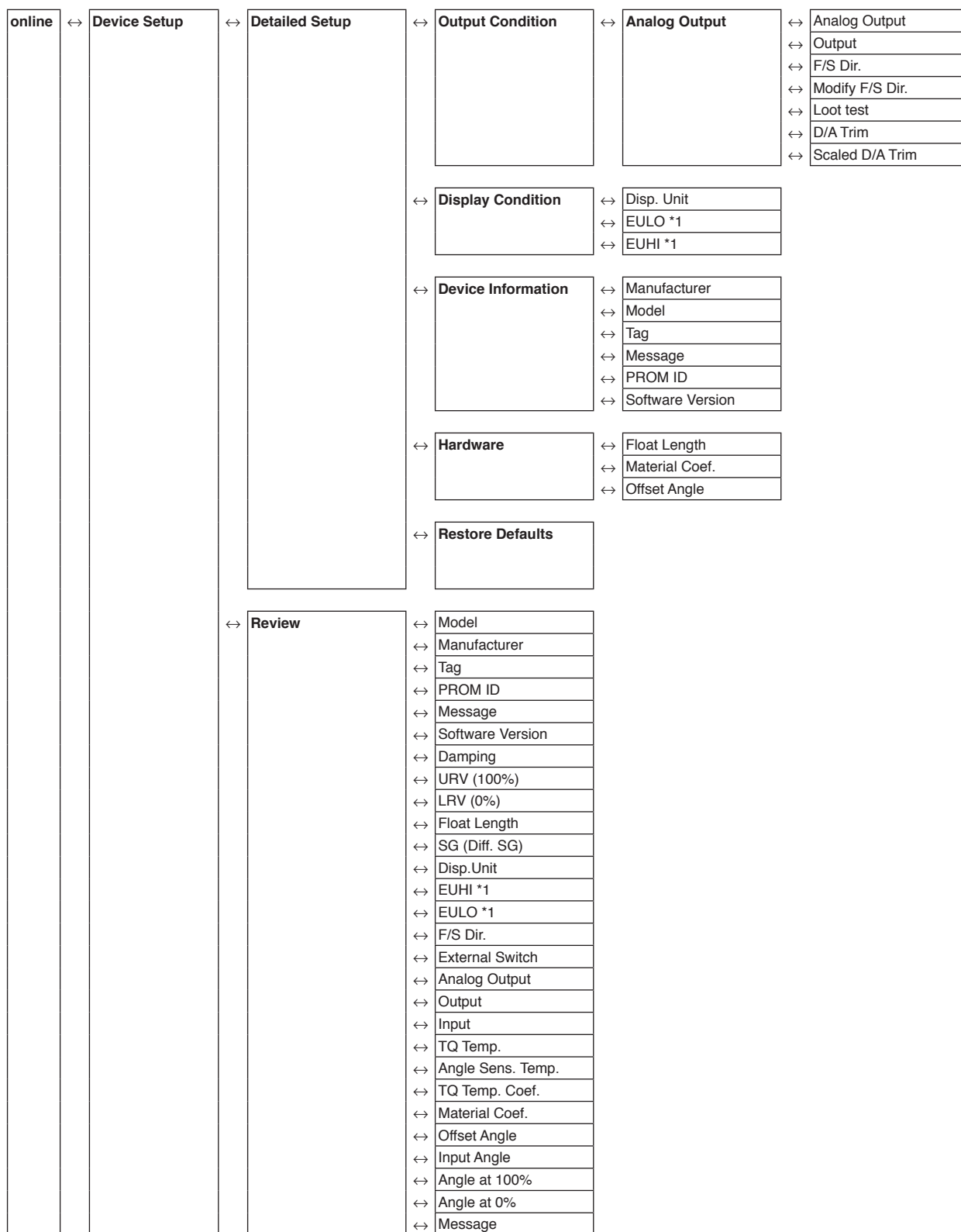
## 2-1. Menu List

Right-clicking “Online” in the menu tree in the left pane of the CommStaff application window displays a menu. Selecting Expand on the menu displays the expanded menu tree.



The following gives details of the menus displayed in the menu tree. Bold items are parameters that can be changed.



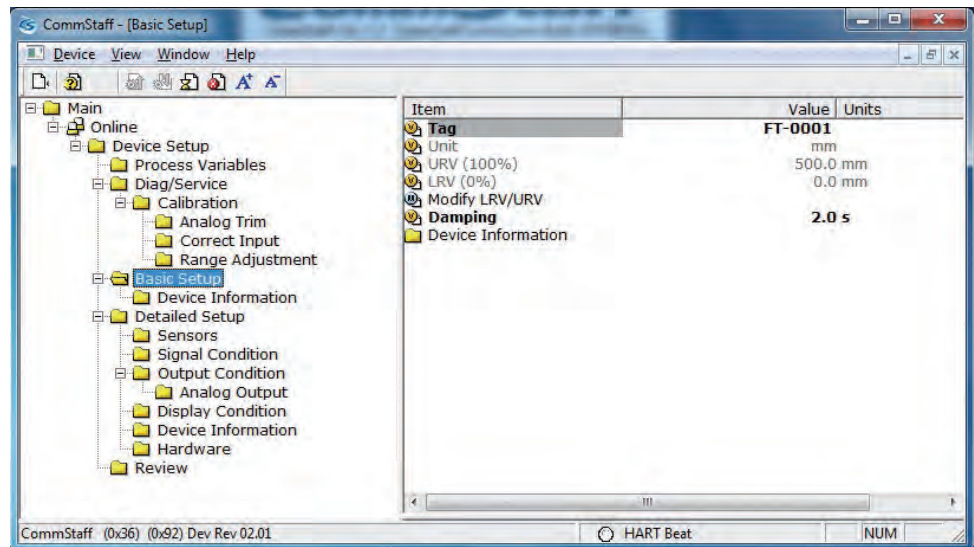


\*1. Displayed if Disp. Unit is set to “Eng. Unit.”



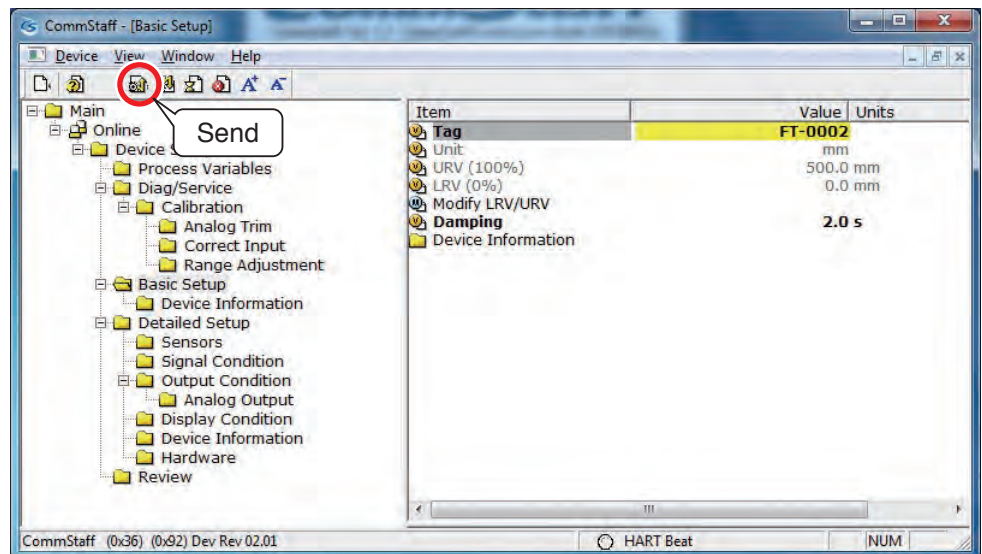
## 2-2. Tag Number Configuration

This section explains how to input or change the tag No. In the menu tree in the left pane, select [Device SetupEVICE SETUP)] → [(DETAILED SETUPBasic setup)] → (Device Information)



Double-clicking Tag displays the settings screen. On this screen, set the Tag and click the Set button.

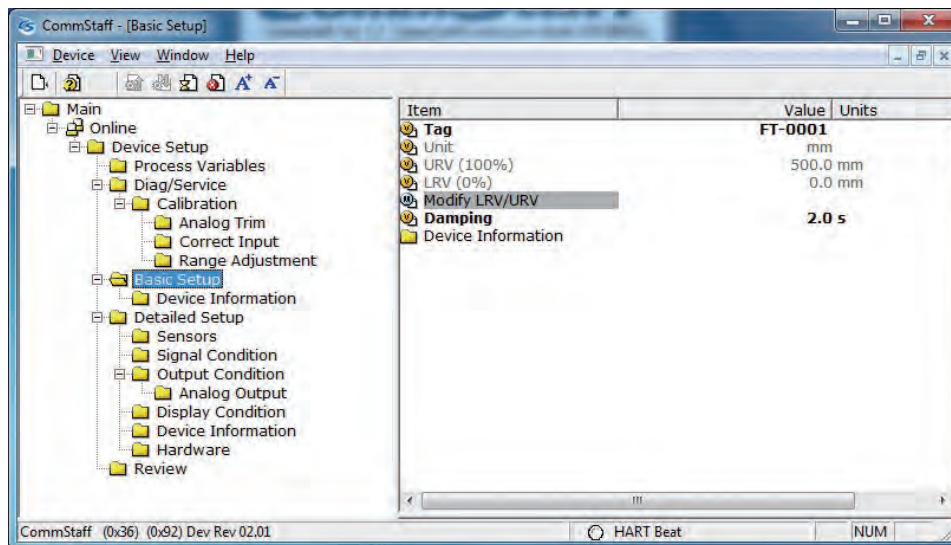
The tag is highlighted in yellow. Click the Send button to send the new Tag to the transmitter.



## 2-3. Range Setting

This section tells how to configure the flow rate range.

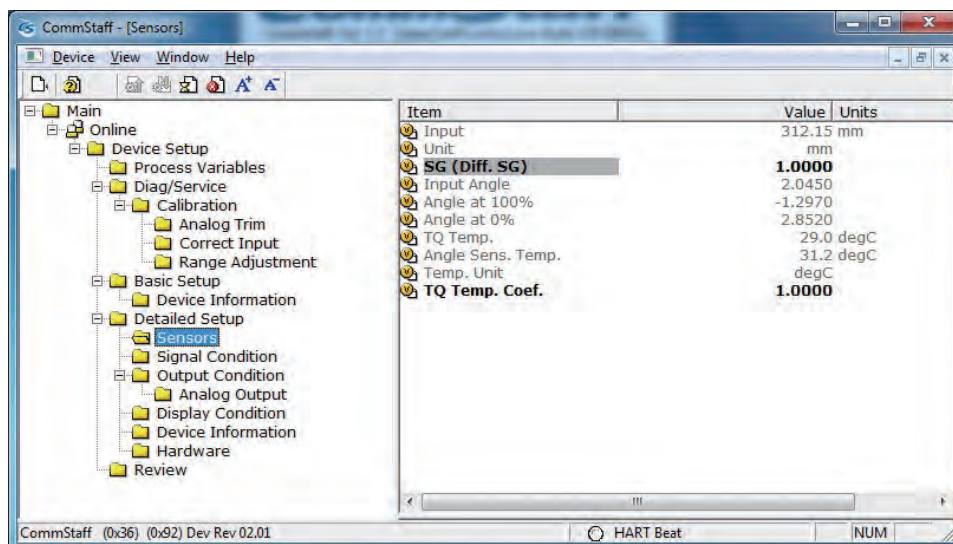
Select [Device Setup] → [Basic Setup] → [Modify LRV/URV].



- A warning that the loop should be switched from automatic control to manual mode is displayed (WARN - Loop should be removed from automatic control). After switching to manual mode, click OK.
- When “Enter LRV (0%) value (mm)” is displayed, input the LRV value and click OK.
- When “Enter URV (0%) value (mm)” is displayed, input the URV value and click OK.
- If transmission was successful, [Modify LRV/URV succeeded] will be displayed. Click OK.
- The "Note - Loop may be returned to automatic control" message is displayed. Click OK.

## 2-4. Setting the Specific Gravity

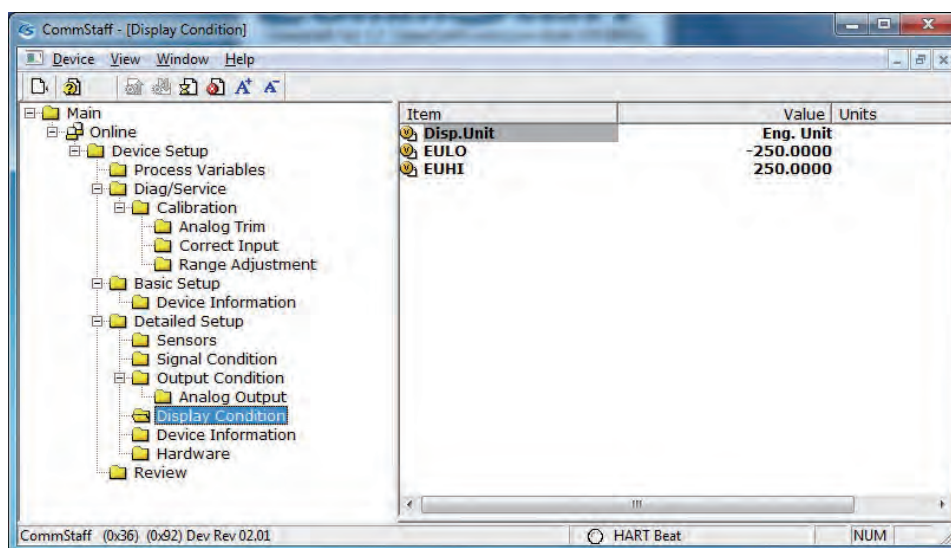
When using this instrument as a level meter, use this screen to set the specific gravity. When using this instrument as a phase boundary meter, use this screen to set the difference in specific gravity between the upper and the lower layer liquids. Select [Device Setup] → [Detailed Setup] → [Sensors] → [SG (Diff. SG)].



## 2-5. Display setup

This section explains how to set up the display.

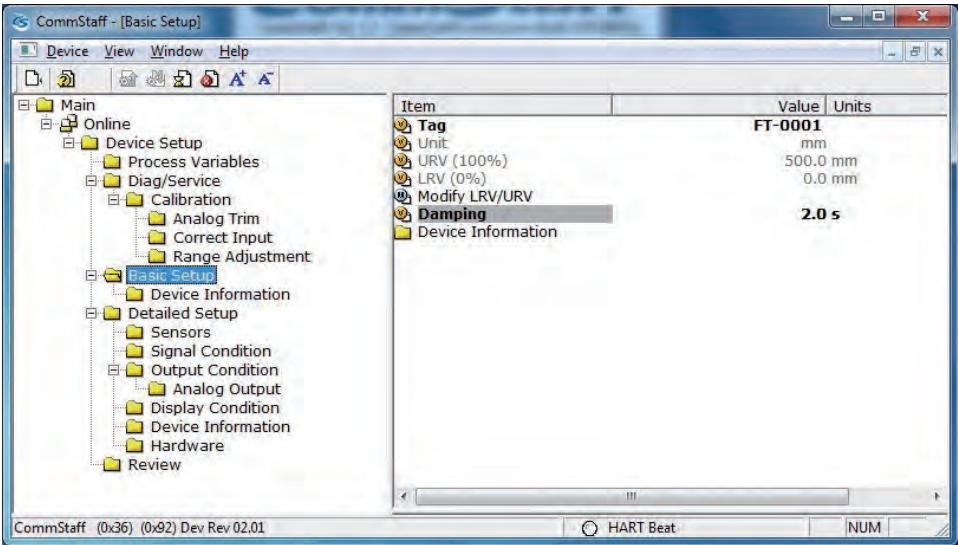
Select [Device Setup] → [Detailed Setup] → [Display Condition] → [Main Display] → [Disp.Unit].



For the unit of display, select either percentage (%) or engineering units (Eng. Unit). If Eng. Unit is selected, set EULO and EUHI as well.

# 2-6. Damping Time Constant Configuration

This section explains how to configure the damping time constant.  
Select [Device Setup] → [Basic setup] → [Damping].



Set a value in the range of 0 to 100 seconds.  
The following values can be input. If a value other than the following is input, the closest value is automatically selected.

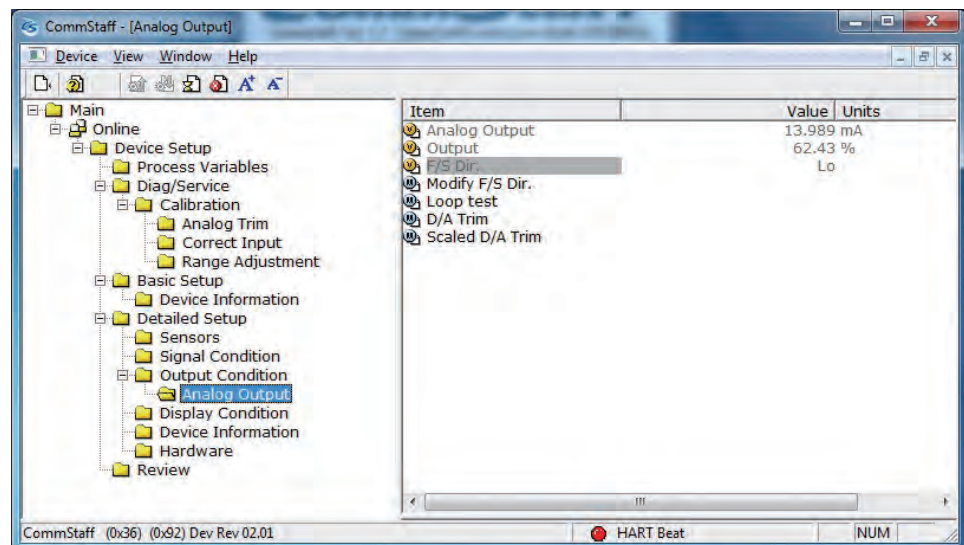
Unit: s

0.0
0.5
2.0
3.0
4.0
5.0
10.0
50.0
100.0

## 2-7. Burnout Direction Confirmation and Configuration

This section explains how to confirm the direction of burnout.

Select [Device Setup] → [Detailed Setup] → [Output Condition] → [Analog Output] → [F/S Dir.].



The burnout direction shows the output behavior if a critical failure occurs.

Non	Output will be unpredictable.
Hi	Output will exceed the upper limit.
Lo	Output will be less than the lower limit.

- To change the direction of burnout, select [Device Setup] → [Detailed Setup] → [Output Condition] → [Analog Output] → [Modify F/S Dir.].
- A warning that the loop should be switched from automatic control to manual mode is displayed (WARN - Loop should be removed from automatic control). After switching to manual mode, click OK.
- Select Hi, Lo, or None and click OK.
- If the send succeeds, [Modify LRV/URV succeeded] will be displayed. Click OK.
- The message “Note - Loop may be returned to automatic control” appears. Click OK.



## 2-8. Zero point adjustment

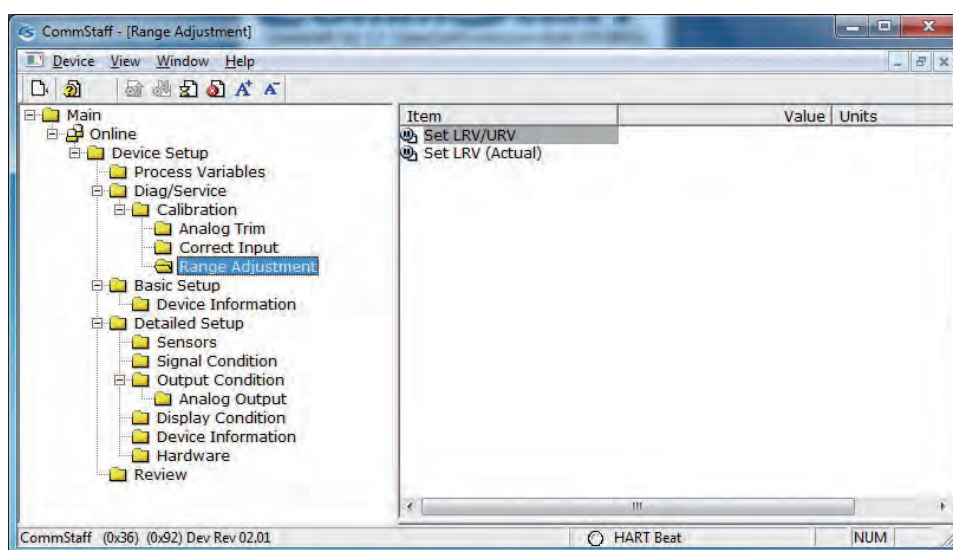
This section explains how to adjust the range. The following three methods are available.

Set LRV	Sets the current input value as the lower limit of the range.
Set URV	Sets the current input value as the upper limit of the range.
Set LRV (Actual)	Adjusts the LRV so that the current sensor output level becomes the specified percentage of output.

### 2-8-1. Set LRV/URV

This section explains how to adjust the Set LRV/URV.

Select [Device Setup] → [Diag/Service] → [Calibration] → [Range Adjustment] → [Set LRV/URV].

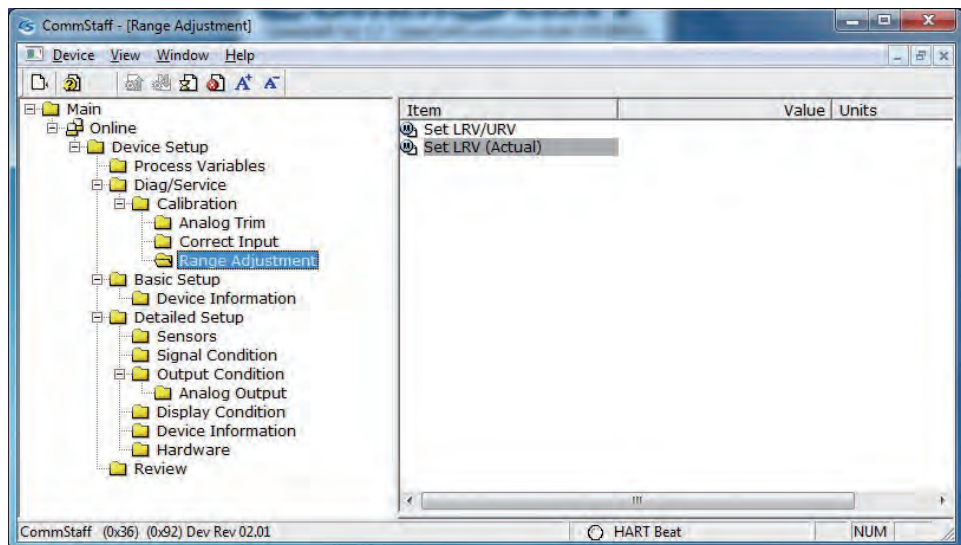


- A warning that the loop should be switched from automatic control to manual mode is displayed (WARN - Loop should be removed from automatic control). After switching to manual mode, click [OK].
- A list of items to be adjusted will be displayed. To adjust LRV or URV, select [LRV (0%)] or [URV (100%)] respectively, and click [OK].
- Either “Apply new LRV (0%) input” or “Apply new URV (100%) input” will be shown. Input the necessary data and click [OK].
- The current (most recently input) value will be displayed. If it is acceptable for the adjustment, select either [Set as LRV(0%) values] or [Set as URV (100%) values], and click [OK]. To changing the input value, after adjusting the input select [Read new values], and click [OK]. To go back to the previous menu without adjusting, select [Leave as found] and click [OK].
- After adjustment, the selection menu appears again. If adjustment work is done, select [Exit] and click [OK]. To continue with further adjustment work, select [LRV(0%)] or [URV(100%)], and click [OK].
- Selecting [Exit] will display the message “Note - Loop may be returned to automatic control.” Click [OK].

## 2-8-2. Set LRV (Actual)

This section explains how to adjust the Set LRV (Actual).

Select [Device Setup] → [Diag/Service] → [Calibration] → [Range Adjustment] → [Set LRV (Actual)].



- A warning that the loop should be switched from automatic control to manual mode is displayed (WARN - Loop should be removed from automatic control). After switching to manual mode, click [OK].
- When the message “Enter new set output (%)” is displayed, input the desired output value and click [OK].
- The message “About to Set output” will be displayed. Click [OK].
- When adjustment is complete the message “Note - Loop may be returned to automatic control” is displayed. Click [OK].



## 2-9. Calibration

Calibration includes the following three functions.

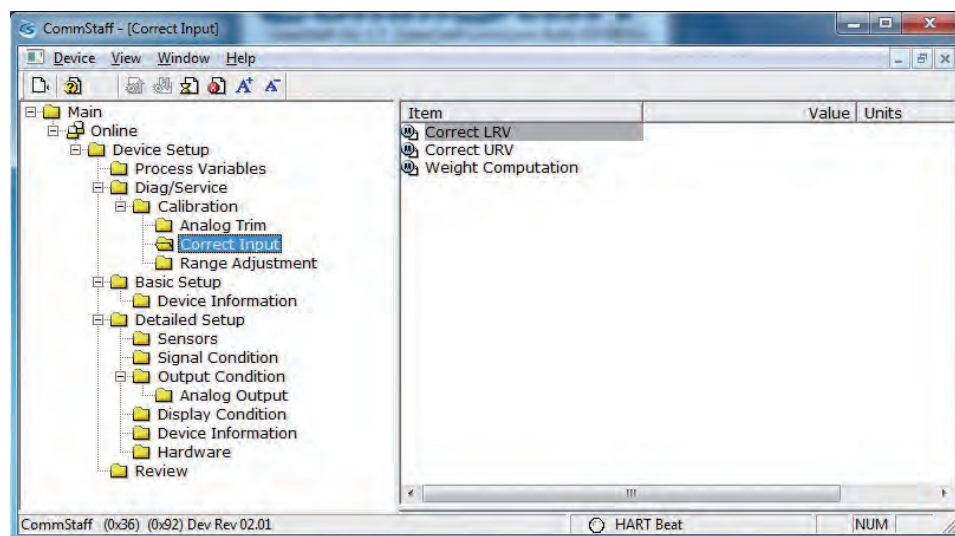
Correct LRV	Calibrates using the zero point (LRV)
Correct URV	Calibrates using the span (URV)
Weight computation for calibration	To calculate the appropriate weight for calibration when using the actual weight

### 2-9-1. Correct LRV

This section explains the Correct LRV function.

**CAUTION:** If the transmitter's process is controlled automatically, this reset action could put the operation at risk by causing output fluctuation. Before resetting, make sure that the control loop for the process is manually controlled.

Select [Device Setup] → [Diag/Service] → [Calibration] → [Correct Input] → [Correct LRV].



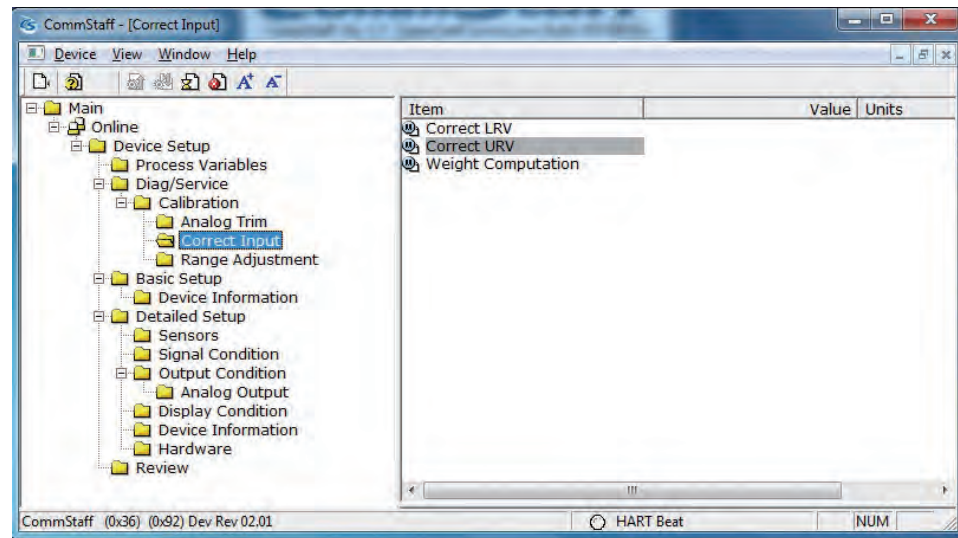
- A warning that the loop should be switched from automatic control to manual mode is displayed (WARN - Loop should be removed from automatic control). After switching to manual mode, click OK.
- “Apply DP LRV value” will be displayed. To apply a weight appropriate for the LRV, click [OK].
- “Press OK when input value is stable” is displayed. After confirming that input pressure has stabilized, click OK.
- If the calibration succeeds, [LRV corrected] will be displayed. Click [OK].
- The “Note - Loop may be returned to automatic control” message is displayed to notify you that you can now switch back to automatic control. Click OK.

## 2-9-2. Correct URV

This section explains the Correct URV function.

**CAUTION:** If the transmitter's process is controlled automatically, this reset action could put the operation at risk by causing output fluctuation. Before resetting, make sure that the control loop for the process is manually controlled.

Select [Device Setup] → [Diag/Service] → [Calibration] → [Correct Input] → [Correct URV].

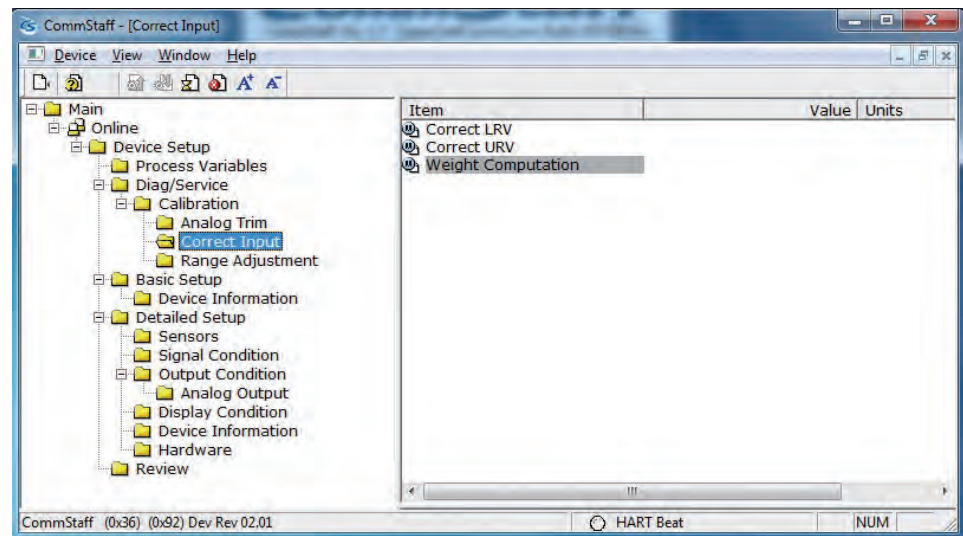


- A warning that the loop should be switched from automatic control to manual mode is displayed (WARN - Loop should be removed from automatic control). After switching to manual mode, click OK.
- “Apply DP URV value” will be displayed. To apply a weight appropriate for the URV, click [OK].
- “Press OK when input value is stable” is displayed. After confirming that input pressure has stabilized, click OK.
- If the calibration succeeds, [URV corrected] will be displayed. Click [OK].
- The “Note - Loop may be returned to automatic control” message is displayed to notify you that you can now switch back to automatic control. Click OK.

### 2-9-3. Weight computation for calibration

This section explains how to use the Weight computation for calibration function.

Select [Device Setup] → [Diag/Service] → [Calibration] → [Correct Input] → [Weight Computation].



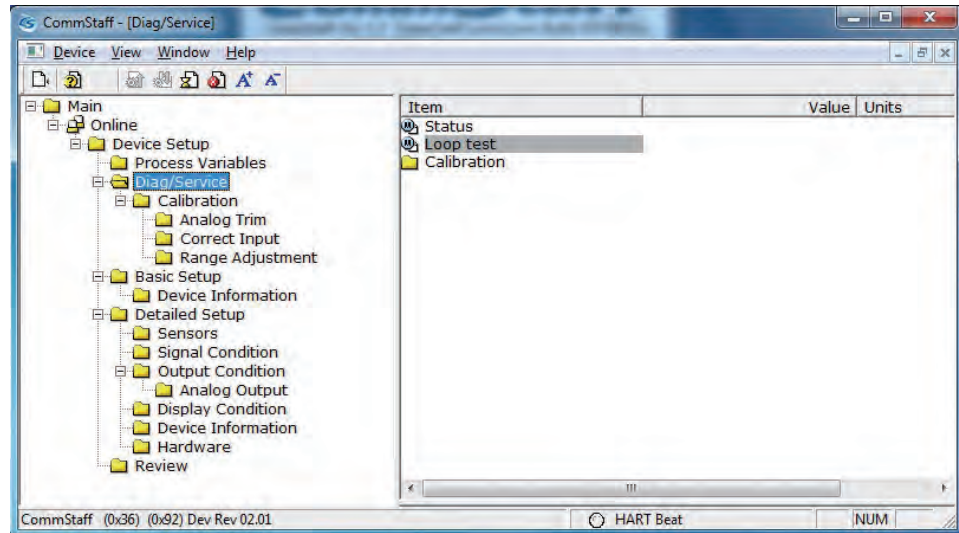
- When the message “Choose meter type” appears, select either [Level meter] or [Phase boundary meter], and click [OK].
- The message “Enter mass of the float (g)” will be displayed. Input the float mass and click [OK].
- When the message “Enter diameter of the float (mm)” is shown, input the float diameter and click [OK].
- If the phase boundary meter option was selected, “Enter specific gravity of the lower liquid” will be shown. Input the specific gravity and click [OK].
- The weight for 0, 25, 50, 75, and 100 % output will be computed and displayed. To complete, click [OK].

## 2-10. Constant current output

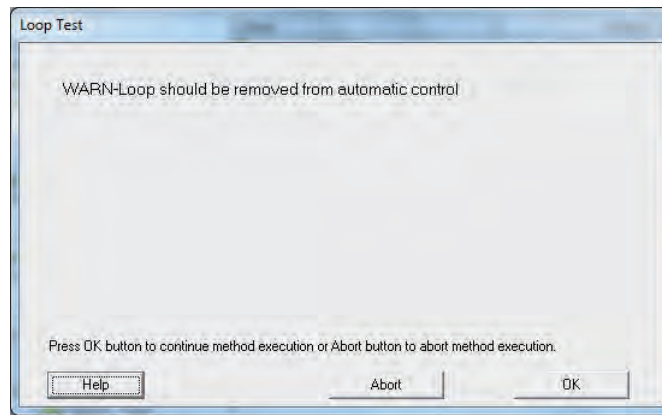
By putting the transmitter in constant current mode, you can keep current outputs constant in the range of 4 - 20 mA. This section explains how to configure the constant current mode and how to return to normal output mode.

Select [Device Setup] → [Diag/Service] → [Loop test].

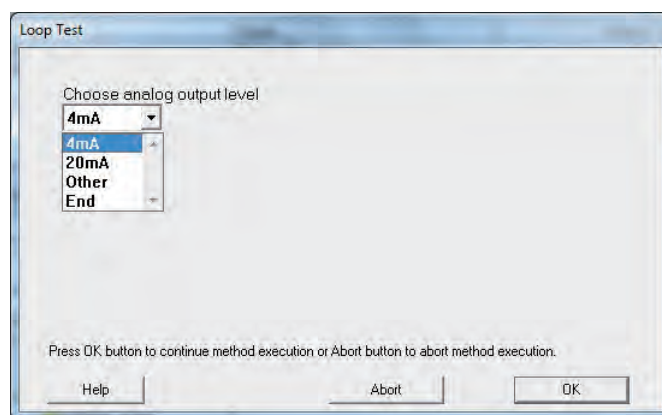
**CAUTION:** If the transmitter's process is controlled automatically, this reset action could put the operation at risk by causing output fluctuation. Before resetting, make sure that the control loop for the process is manually controlled.



Double-clicking Loop Test displays the following screen.



Click OK if there are no problems. The screen changes to the following.



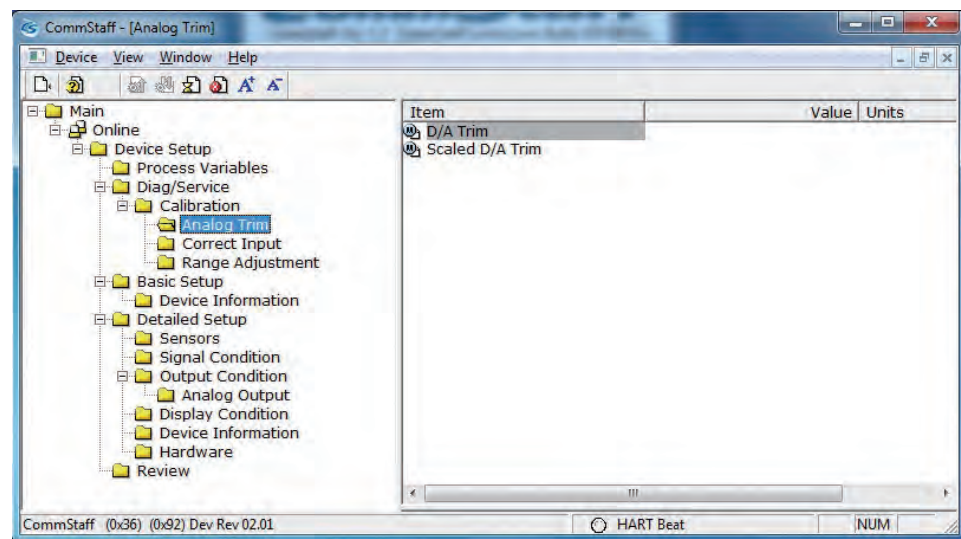
- Select 4 mA and click OK. Output signals are kept at 4 mA (0%).
- Select 20 mA and click OK. Output signals are kept at 20 mA (100%).
- To input a different value, select Other and Click OK.
- If you select End and click OK, a message is displayed notifying you that this will return operation to normal output mode.

## 2-11. Calibration of output current

By connecting to an ammeter and comparing measured values, you can calibrate the 0% and 100% analog outputs.

Select [Device Setup] → [Diag/Service] → [Calibration] → [Analog Trim] → [D/A Trim].

**CAUTION:** If the transmitter's process is controlled automatically, this reset action could put the operation at risk by causing output fluctuation. Before resetting, make sure that the control loop for the process is manually controlled.

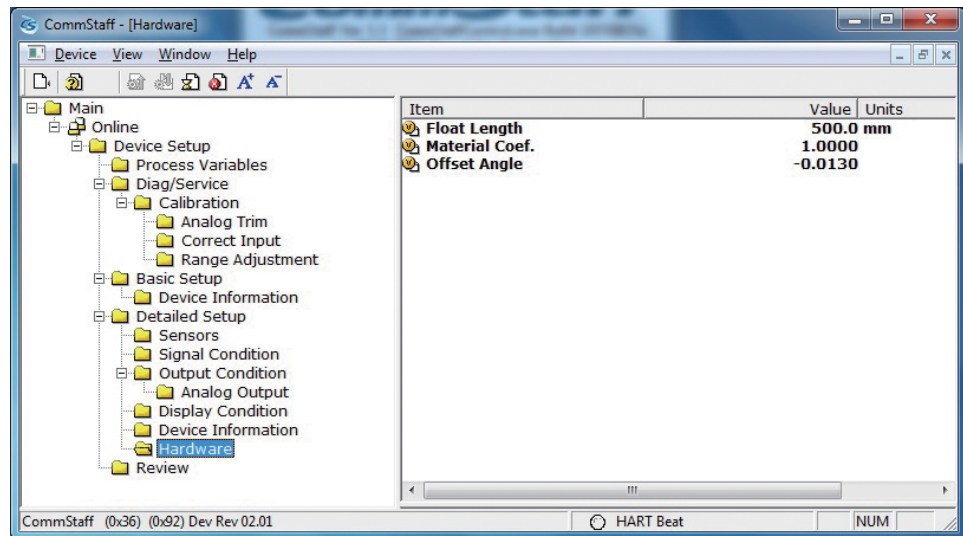


Step	Operation and indication
1	<p>Double-click D/A Trim.</p> <p>WARN - Loop should be removed from automatic control</p> <p>A warning that the loop should be switched from automatic control to manual mode is displayed. After switching to manual mode, click OK.</p> <p>“Connect reference meter” is displayed. Connect the loop to an ammeter (mA) or voltmeter. (It is recommended that an ammeter or voltmeter with an accuracy of 0.03% or better be used.)</p>
2	<p>The following messages are displayed in the order given.</p> <p>Setting fld dev output to 4mA (about to set transmitter output to 4 mA)</p> <p>Click OK if there are no problems.</p> <p>Enter meter value (input the ammeter reading).</p> <p>Input the reading of the ammeter and click OK. This allows the adjustment command to be sent to the transmitter.</p> <p>Fld dev output 4.000mA equal to reference meter? (is the transmitter output equal to the reading on the connected ammeter?)</p> <p>If the transmitter output is not equal to the reading of the ammeter, select No and click OK. This allows the adjustment process to continue.</p>
3	<p>Next do the 20 mA calibration.</p> <p>The following messages are displayed in the order given.</p> <p>Setting fld dev output to 20mA (about to set transmitter output to 20 mA)</p> <p>Click OK if there are no problems.</p> <p>Enter meter value (input the ammeter reading)</p> <p>Input the reading of the ammeter and click OK. This allows the adjustment command to be sent to the transmitter.</p> <p>Fld dev output 20.000mA equal to reference meter? (is the transmitter output equal to a reading of the connected ammeter?)</p> <p>If the transmitter output is not equal to the reading of the ammeter, select No and click OK. This allows the adjustment process to continue.</p> <p>Finally, a message is displayed notifying you that this will return operation to normal measurement mode and that the 20 mA calibration process is complete.</p>

## 2-12. Hardware information

This section explains how to set Float Length, Material Coef. and Offset Angle.

Depending on the desired item, select [Device Setup] → [Detailed Setup] → [Hardware] → [Float Length] / [Material Coef.] / [Offset Angle].



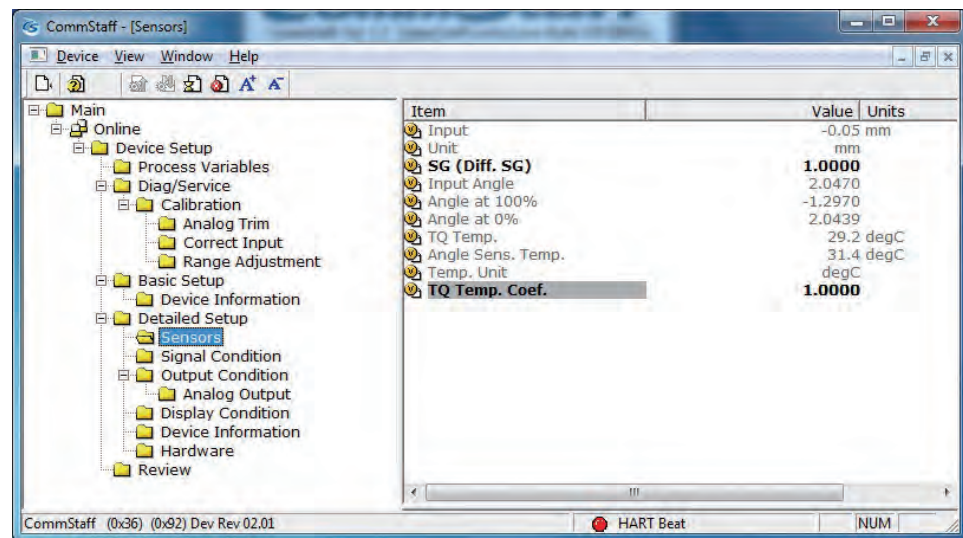
Note: If any of the settings of float length, material coefficient, and offset angle is changed, proper measurement may be impossible.



## 2-13. TQ Temp. coef.

This section shows how to set the TQ (torque tube) temperature coefficient.

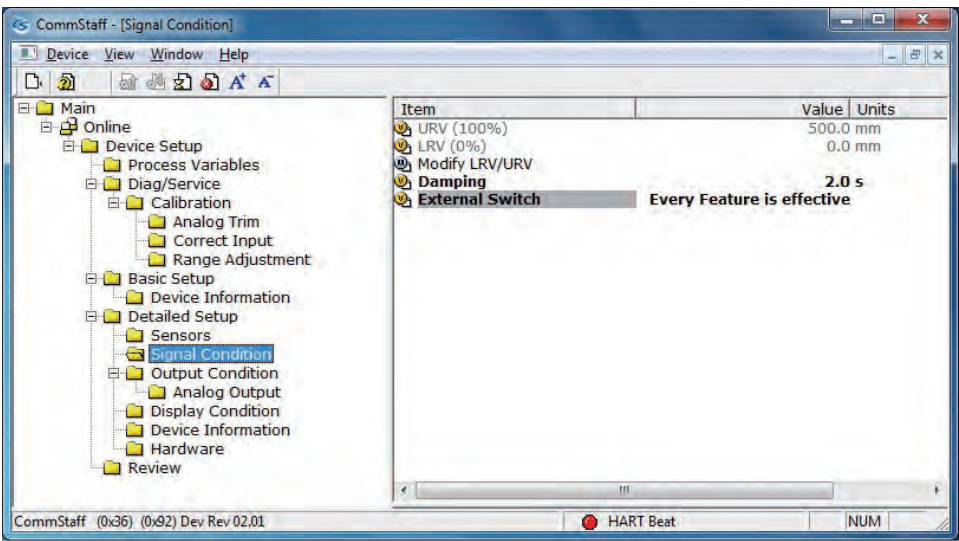
Set [Device Setup] → [Detailed Setup] → [Sensors] → [TQ Temp. Coef.].



## 2-14. External Switch Settings.

This section explains the functions that can be performed by the external switches.

Set [Device Setup] → [Detailed Setup] → [Sensors] → [TQ Temp. Coef.].



The following two items can be selected.

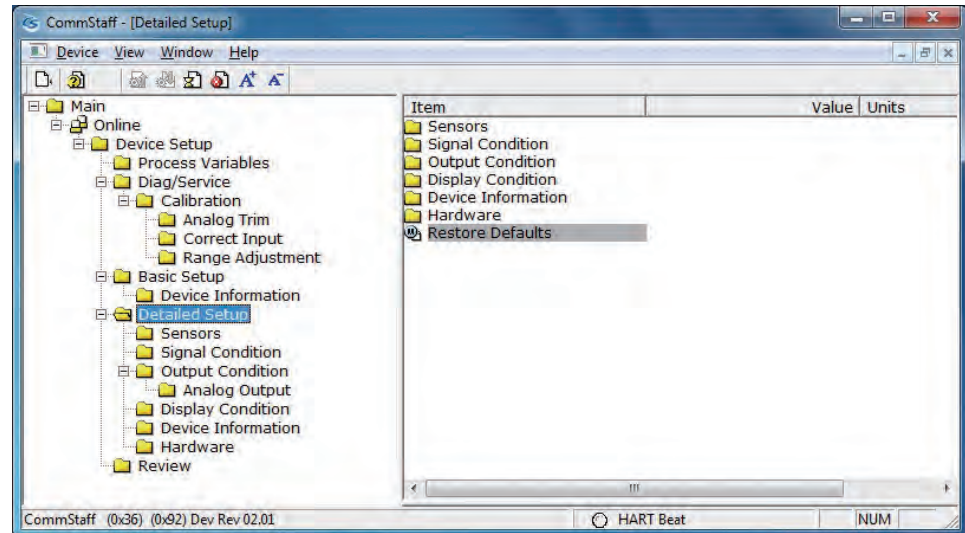
Every feature is effective	Every feature is available. Damping, zero-span adjustment, and setting LRV (actual) can be done by the external switches.
Only Set LRV (Actual) is effective	Only the setting of the LRV (actual) can be done.

## 2-15. Restore Factory Defaults

This function restores the factory-shipped settings and adjusted values.

**CAUTION:** After restoring the factory defaults, exit CommStaff and restart it.

Set [Device Setup] → [Detailed Setup] → [Restore Defaults].



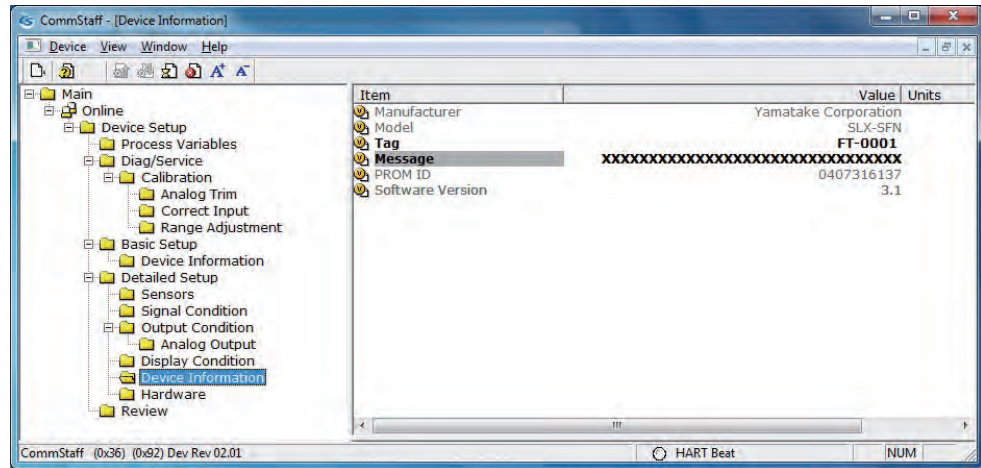
- A warning that the loop should be switched from automatic control to manual mode is displayed (WARN - Loop should be removed from automatic control). After switching to manual mode, click OK.
- Executing this function will remove all the data input by the user. The message “This returns to the setting in case of shipment. All setting which was changed by the customer is lost” will be shown. Click [OK] to restore the defaults.
- If sent successfully, the message “All settings and calibration data are reset to factory default values. Exit CommStaff and restart CommStaff” will be displayed. When the procedure is complete, be sure to exit CommStaff and restart it. Click [OK].
- The “Note - Loop may be returned to automatic control” message is displayed to notify you that you can now switch back to automatic control. Click OK.

## 2-16. Memo

A memo stored within the device can be set and displayed.

The maximum length is 32 alphanumeric characters.

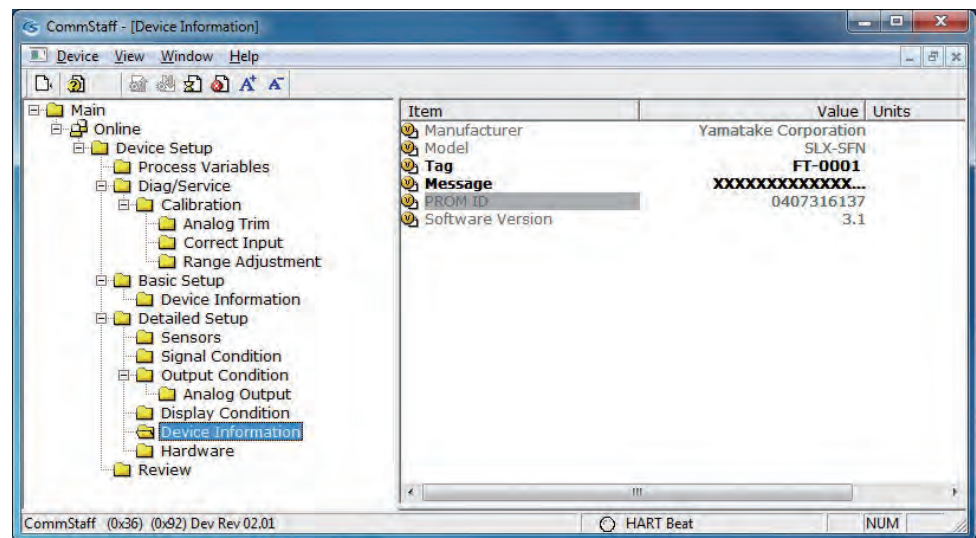
Select [Device Setup] → [Detailed Setup] → [Device Information] → [Message].



## 2-17. PROM ID

The following shows how to check the PROM ID.

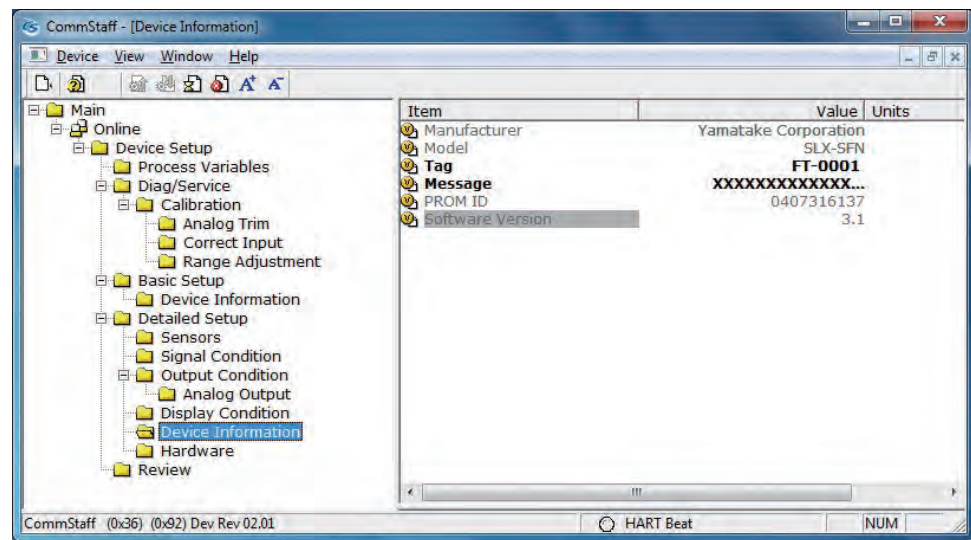
Select [Device Setup] → [Detailed Setup] → [Device Information] → [PROM ID].



## 2-18. Software version

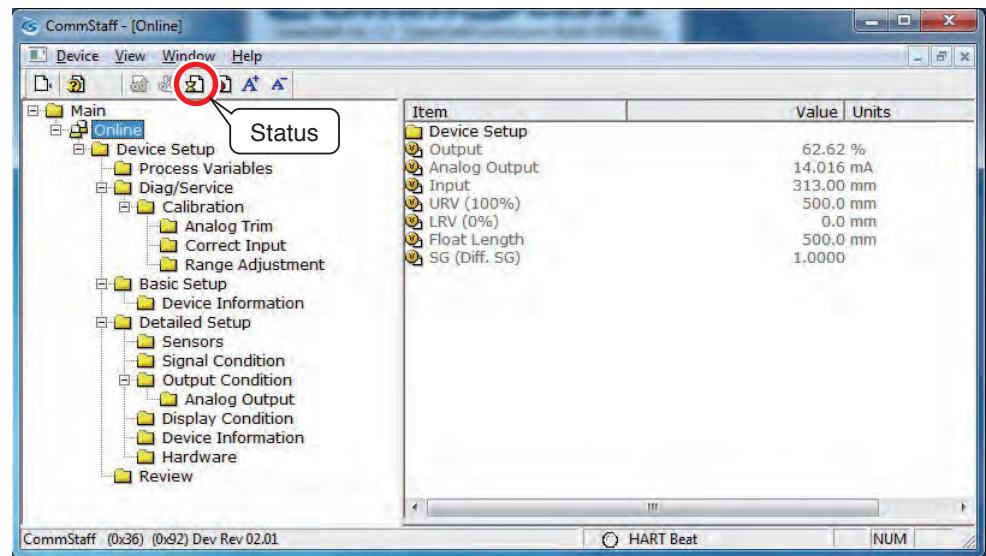
The software version of the device can be displayed as shown below.

Select [Device Setup] → [Detailed Setup] → [Device Information] → [Software Version].



## Chapter 3. Checking Self-diagnostic Messages

You can check self-diagnostic messages by clicking the Status icon in the below or “Device status” in the “Display” menu.



### 3-1. Status Message

Status message	Meaning	Required action
Internal data inconsistency		
Invalid database	Configuration data and/or calibration data is invalid.	Tap [Exit] and try communicating again. Verify configuration data and recalibrate the device.
Critical failure		
Chara. PROM Faul	PROM function fault	Invalid device characteristics data. Contact appropriate personnel.
Suspect Input	<ul style="list-style-type: none"> <li>- Input data error</li> <li>- Problem with the process</li> <li>- Device error</li> </ul>	Invalid sensor and/or electronics board. Contact appropriate personnel.
NVM Fault	Electronic component failure	Bad electronics board. Contact appropriate personnel.
RAM Fault	Electronic component failure	Bad electronics board. Contact appropriate personnel.
ROM Fault	Electronic component failure	Bad electronics board. Contact appropriate personnel.
Device status		
Meter Body Over Temperature	Meter body temperature is too high.	Reinstall the device to decrease the temperature to within specifications.
Excess DP Zero Correct	DP Zero correction factor is outside acceptable limits for accurate operation.	Check if the calibration value is suitable for the input pressure value. Recalibrate device.
Excess DP Span Correct	DP Span correction factor is outside acceptable limits for accurate operation.	Check if the calibration value is suitable for the input pressure value. Recalibrate device.
In Special Mode	Device is operating in DP mode, PP mode, Simulation mode, Output mode and/or Pulse output mode.	Return to measuring mode to clear message.
DP Overload	The input differential pressure exceeds operating limits. In such a case output is at the upper or lower limit.	Check whether or not the flow rate is within specifications.
Meter Body Fault	<ul style="list-style-type: none"> <li>- The input differential pressure exceeds two times the upper range limit of the device.</li> <li>- Device error</li> </ul>	Check whether or not the flow rate is within specifications.
DP Correct Reset	DP calibration data discarded.	Calibrate the zero point and span on the DP calibration screen.
Excess PP Zero Correct	The PP Span correction factor is outside the acceptable limits for accurate operation.	Check if the calibration value is suitable for the input pressure value. Recalibrate device.
Excess PP Span Correct	The PP Span correction factor is outside the acceptable limits for accurate operation.	Check if the calibration value is suitable for the input pressure value. Recalibrate device.
PP Overload	<ul style="list-style-type: none"> <li>- The input static pressure exceeds two times the upper range limit of the device.</li> <li>- Device error</li> </ul>	Check whether or not the static pressure is within specifications.
PP Correct Reset	PP calibration data discarded.	Calibrate the zero point and span on the PP calibration screen.



In DP Mode	The device is operating in differential pressure mode.	Exit DP Calibration screen to clear differential pressure mode.
In PP Mode	The device is operating in process pressure (static pressure) mode.	Exit PP Calibration screen to clear process pressure mode.
In DP Input Mode	The device is operating in DP simulation mode.	Tap [Clear] to exit DP simulation mode.
In PP Input Mode	The device is operating in PP simulation mode.	Tap [Clear] to exit PP simulation mode.
In Output Mode	The device is operating in output mode.	Tap [Clear output mode] to clear output mode.
In Pulse Output Mode	The device is operating in pulse output mode.	Tap [Clear output mode] to clear pulse output mode.



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**Document Number:** CM2-CFS100-2009

**Document Name:** Field Communication Software  
CommStaff Model: CFS100  
Instruction Manual (Smart Displacement type Level  
Transmitter SLX Series Edition)

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**Date:** Nov. 2011 (initial)

**Issued/Edited by:** Yamatake Corporation

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**Yamatake Corporation**