

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

## **Instruction Manual (Smart Valve Positioner 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 the Smart Valve Positioner

- SVP3000 Alphaplus Smart Valve Positioner
  - Model number : AVP300/301/302  
AVP200/201/202
- Smart Valve eXplorer Smart Positioner for rotary valves
  - Model number : SVX100/102

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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 <sup>\*1</sup> as well as the HART <sup>\*2</sup> communication protocol.

\*1. DE output is not supported.

\*2. HART is a registered trademark of the HART Communication Foundation.

This manual explains how to use CommStaff with a Smart Positioner, one of the devices that CommStaff supports. 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.*

Also, for details on the Smart Valve Positioner's functions and method of connection, please refer to the operation manual for the Smart Valve Positioner.

- AVP30\_/20\_ model: CM2-AVP300-2001
- SVX\_ model: CM2-SVX100-2001

## 1-2. Important Notes

- When changing connected devices

CommStaff continues communicating with the device when displaying dynamic values, such as valve travel, 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.

- When a travel transmission signal is used for process control, with SFN communication the travel transmission signal may fluctuate, resulting in a dangerous situation. With SFN communication, be sure to switch the process control loop to manual mode.
- When changing the settings with HART communication, change the mode to Out of service before changing the settings.
- 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

With CommStaff version 1.2 and later, the following Smart Positioners are supported.

## ● HART model

- Device type: SVP

HART Version	HART 5
S/W Version	V5.0–V5.2 (AVP302, AVP202) V4.C–V4.F (SVX102)

- Device type: SVP-V2

HART Version	HART 6
S/W Version	V6.0–V6.F (AVP302, AVP202)

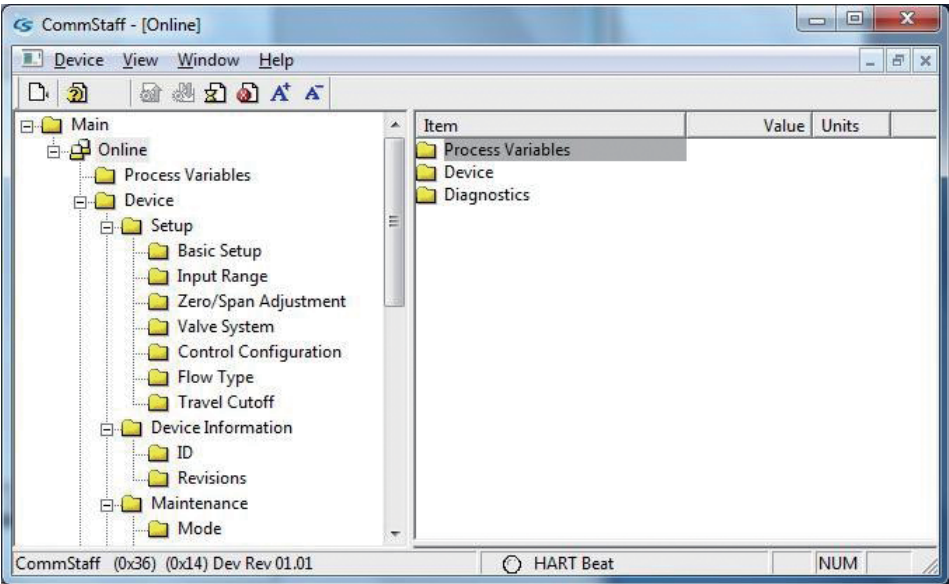
## ● SFN model

S/W Version	–V3.F (AVP300/301, AVP200/201) V5.0–V6.F (AVP302, AVP202) V4.5–V4.C, V3.E (SVX100) V4.5–V4.F, V6.0–V6.F (SVX102)
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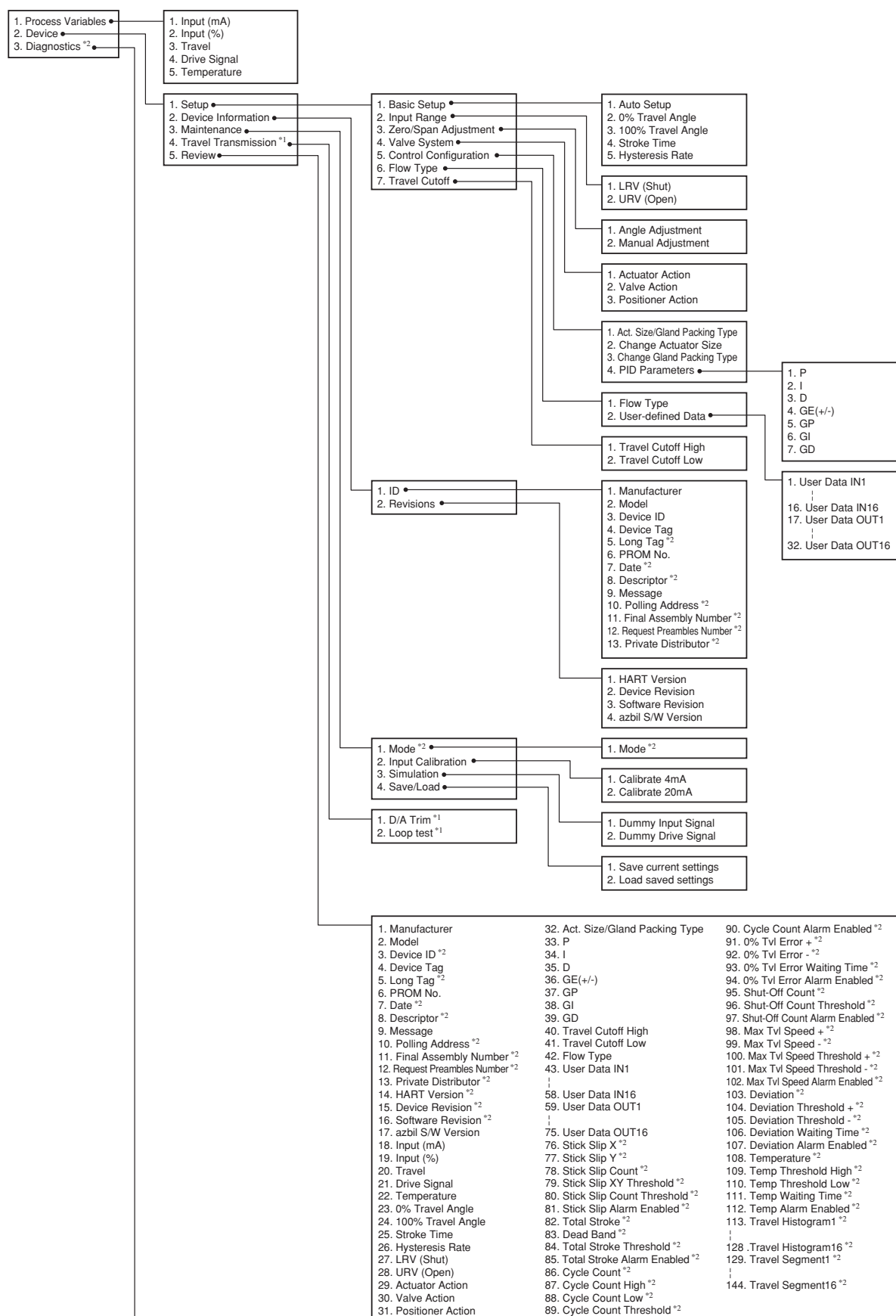
# Chapter 2. Configuration

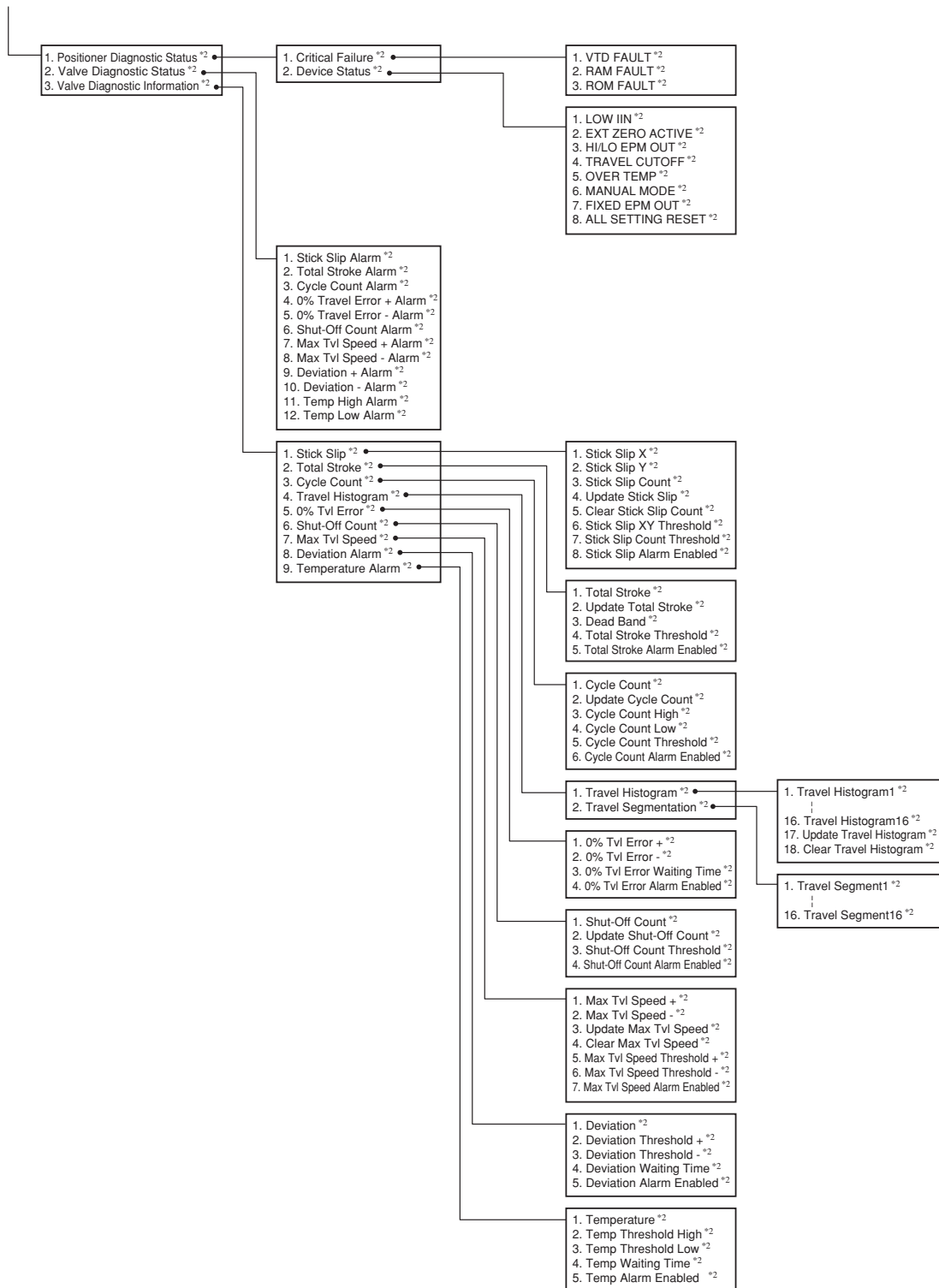
## 2-1. Menu List

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.





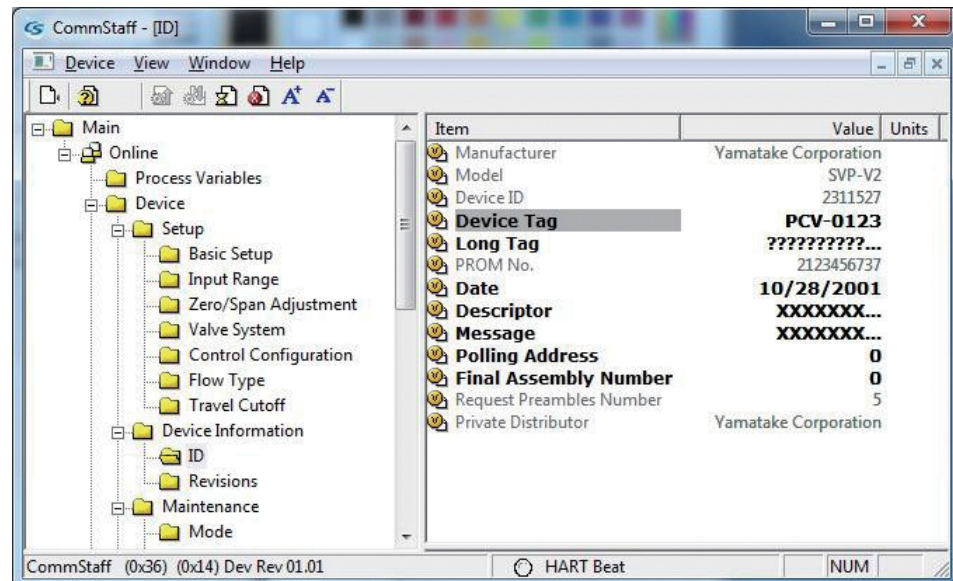
\*1 Not displayed if HART communications is selected.

\*2 Not displayed if SFN communications is selected.

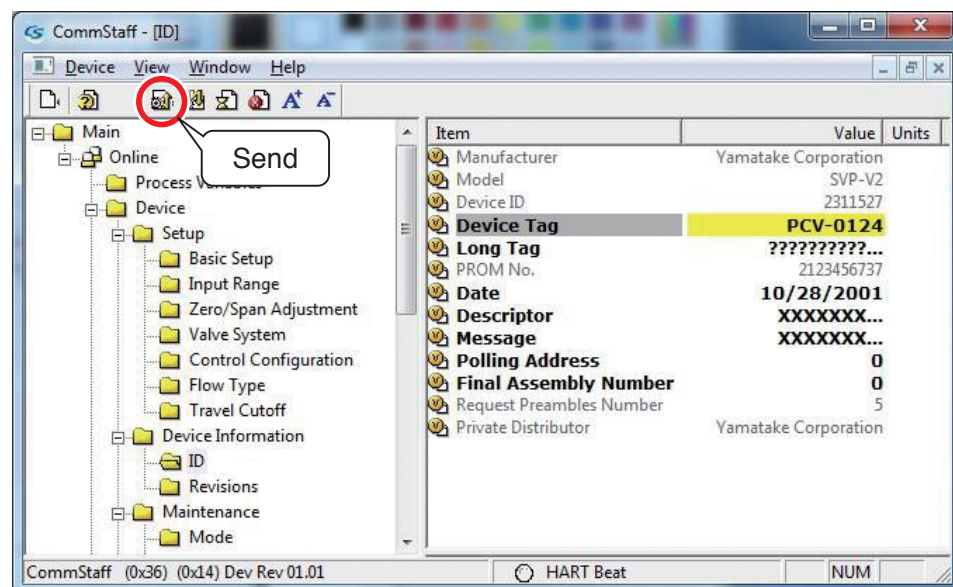
## 2-2. Device Tag

This section explains how to input or change the tag No.

In the menu tree in the left pane, select [Device] → [Device Information] → [ID] → [Device Tag].

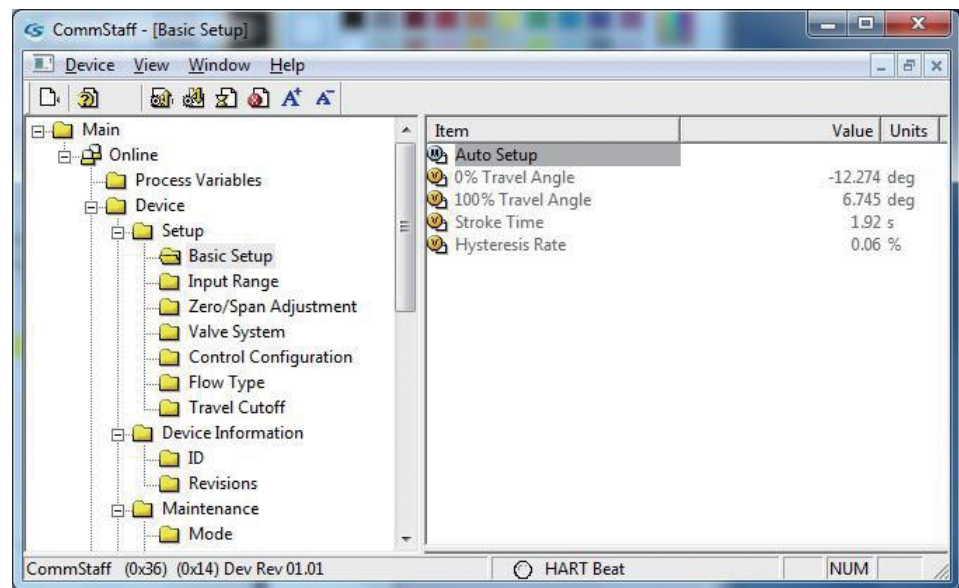


Double-clicking Tag displays the settings screen. On this screen, set the Tag and click the Set button. The tag is highlighted in yellow. Click the Send button to send the new Tag to the transmitter.



## 2-3. Auto Setup

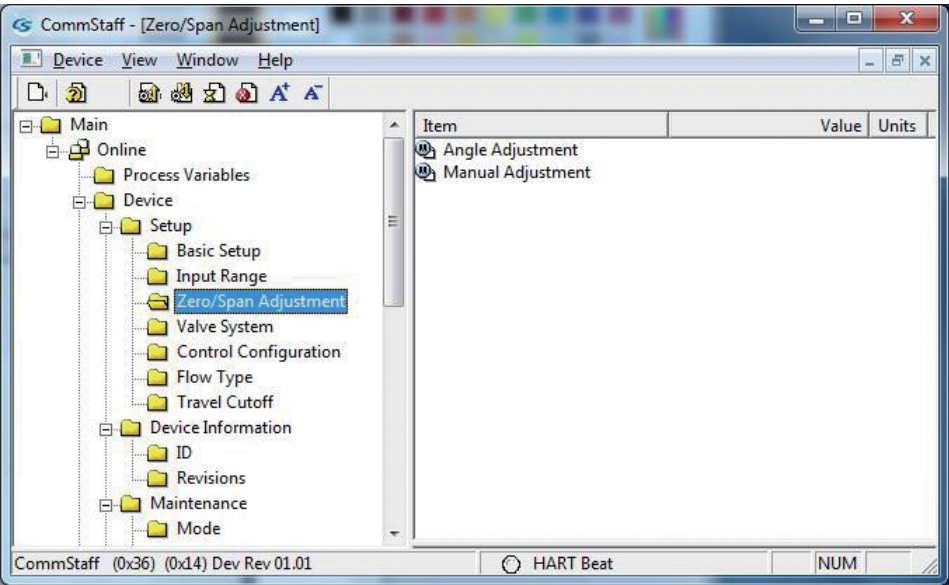
Select [Device] → [Setup] → [Basic Setup] → [Auto Setup].



- In the HART version if the mode is In Service, a warning alerts the user to switch it to Out of service.  
To change the mode to Out of service, select [Device] → [Maintenance] → [Mode].
- Since the valve will move, a caution is displayed to confirm the safety of the operation. Click OK.
- When a completion message is displayed. Click OK to complete auto setup.
- After auto setup is executed, exit CommStaff and restart.
- Execute zero/span adjustment and check to make sure that the control valve operates normally.

# 2-4. Zero/Span Adjustment

Execute zero/span adjustment to set the degree of valve opening.  
Select [Device] → [Setup] → [Zero/Span Adjustment].

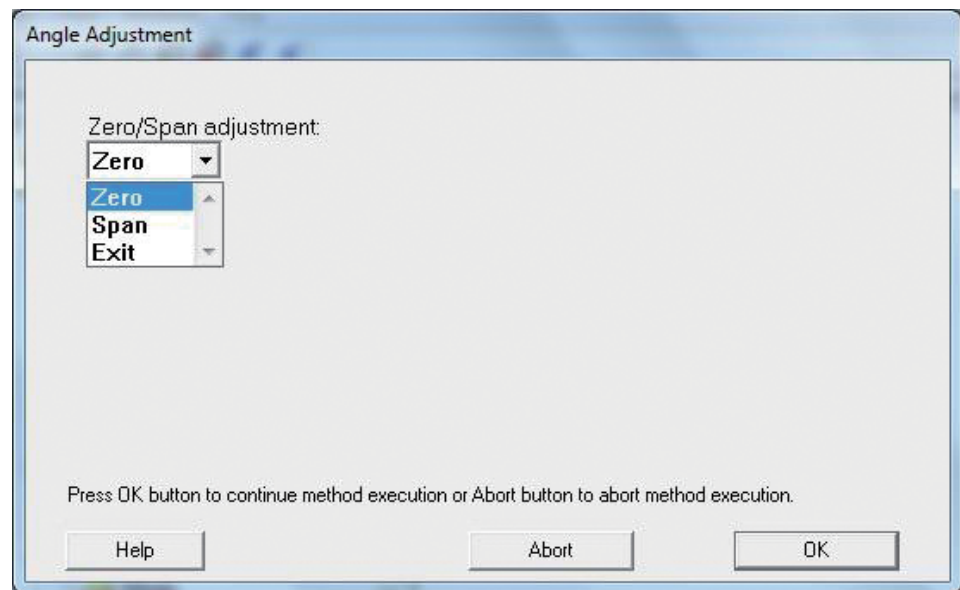




## 2-4-1. Angle Adjustment

Adjusts the angle for zero/span.

Select [Device] → [Setup] → [Zero/Span Adjustment] → [Angle Adjustment].



### ● Zero adjustment

Select [Device] → [Setup] → [Zero/Span Adjustment] → [Angle Adjustment] → [Zero].

- Set the current input to 0 % (the amount of current set for the LRV).
- Set Travel Cutoff Low to be less than 0 %.
- Select the amount of angle increase or decrease and adjust the value.
- After adjustment, change Travel Cutoff Low back to its original value.

### ● Span adjustment

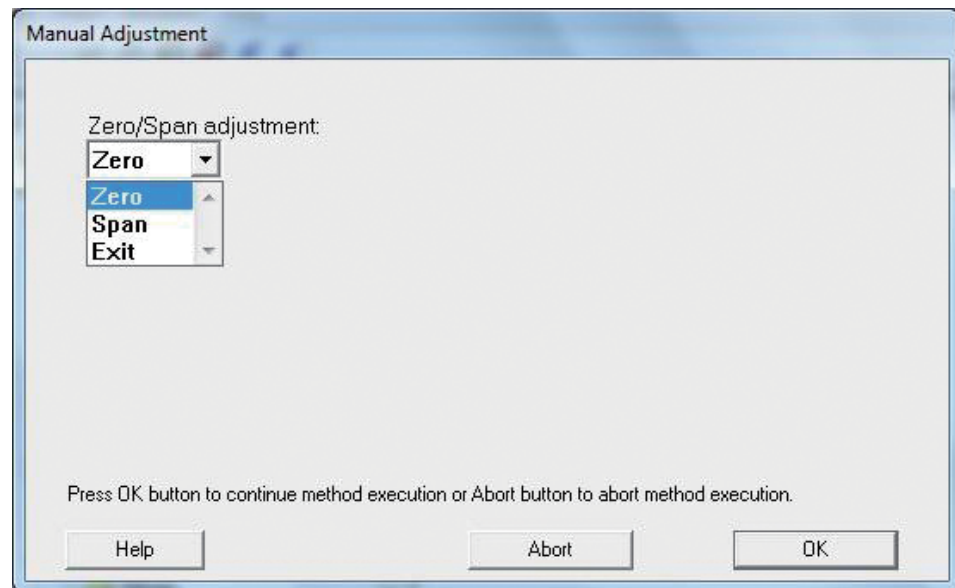
Select [Device] → [Setup] → [Zero/Span Adjustment] → [Angle Adjustment] → [Span].

- Set the current input to 100 % (the amount of current set for the URV).
- When adjusting the span angle, set Travel Cutoff High to be more than 100 %.
- Select the amount of angle increase or decrease and adjust the value.
- After adjustment, change Travel Cutoff Low back to its original value.

## 2-4-2. Manual setting for zero/span adjustment

Sets the angle for zero/span.

Select [Device] → [Setup] → [Zero/Span Adjustment] → [Manual Adjustment]



### ● Zero adjustment

- Use current input, actuator pressure, the manual handle, etc. to change the position to 0 % degree of opening.
- Set the zero point position.

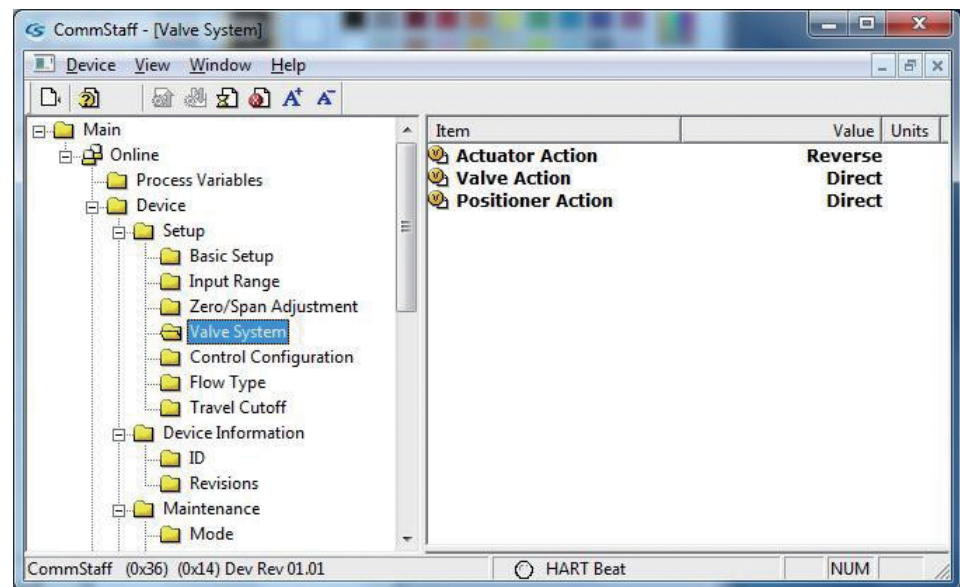
### ● Span adjustment

- Use current input, actuator pressure, the manual handle, etc. to change the position to 100 % degree of opening.
- Set the zero point position.

## 2-5. Valve System

Sets the type of control valve action (actuator and valve itself) and positioner action.

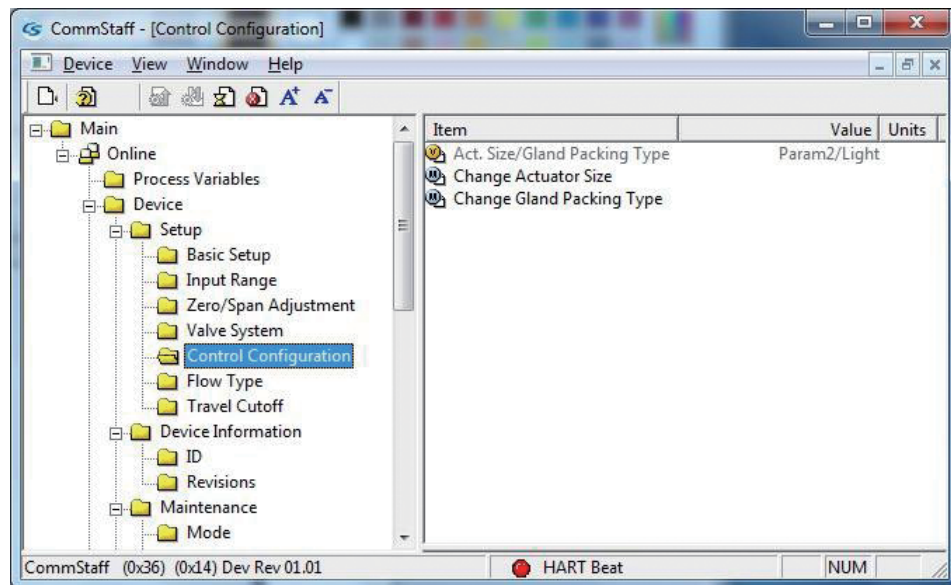
Select [Device] → [Setup] → [Valve System].



- Select Direct or Reverse for Actuator Action, Valve Action, and Positioner Action.

## 2-6. Control Configuration

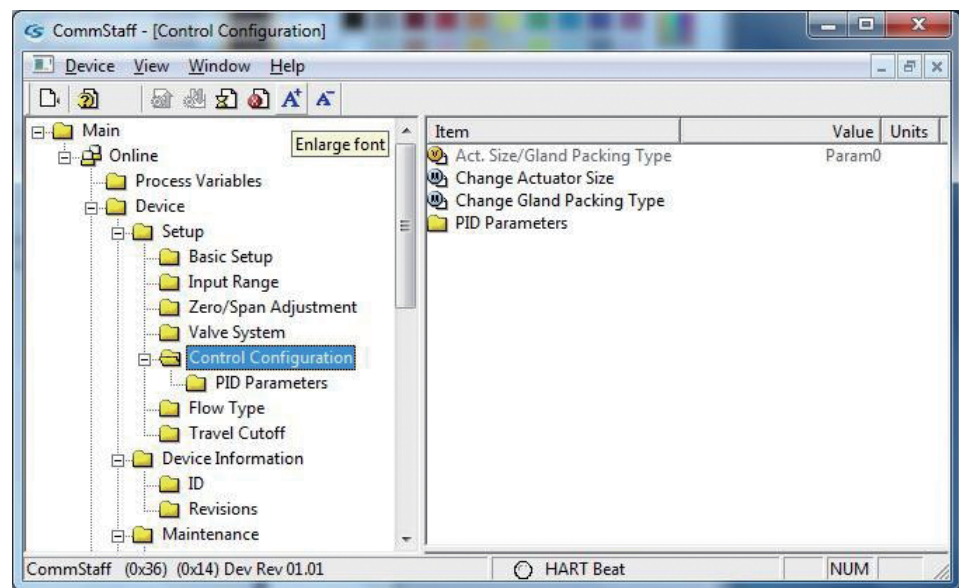
Select [Device] → [Setup] → [Control Configuration].



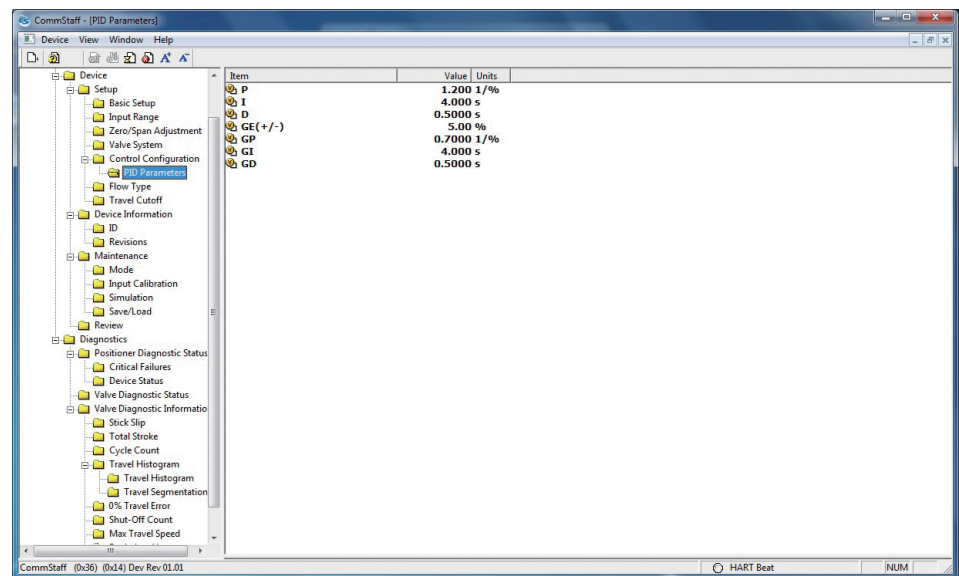
- Set Actuator Size and Gland Packing Type.
- When Actuator Size is Param0, the PID is set separately.
- The param0 PID value will be shown in Review even if Actuator Size is not param0 if the HART version device type is either SVP or SFN. Also, when device data is saved in CSV or PDF format, it will be saved in the same way as in Review.

## ● HART version device type: SVP-V2 , with Param0

Click the PID Parameters folder.

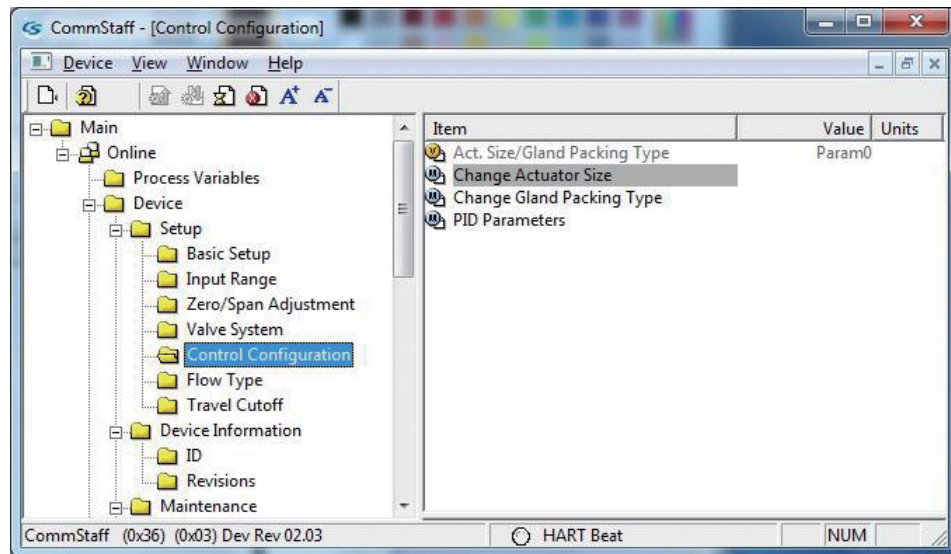


Set the PID Parameters.

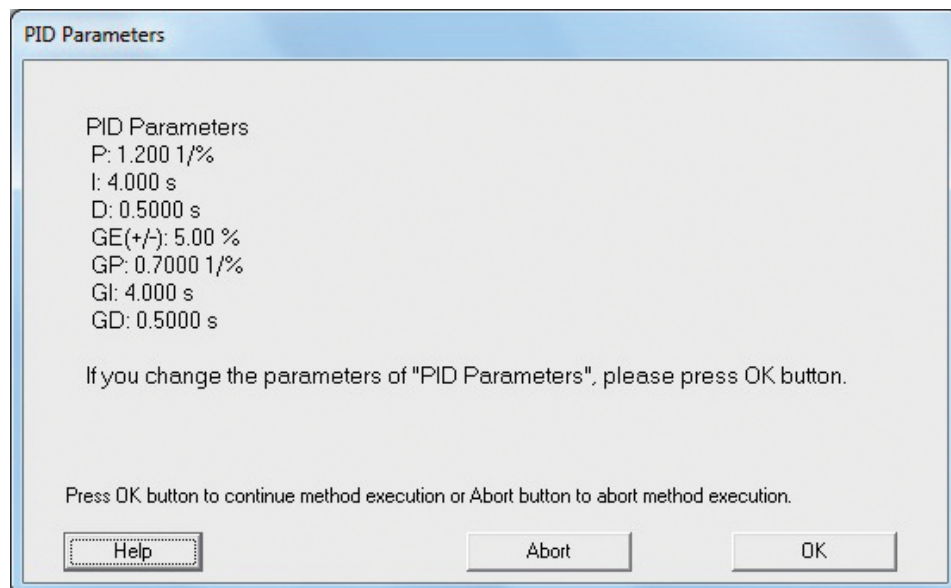


● HART version device type: SVP or SFN, with Param0

Click PID Parameters.

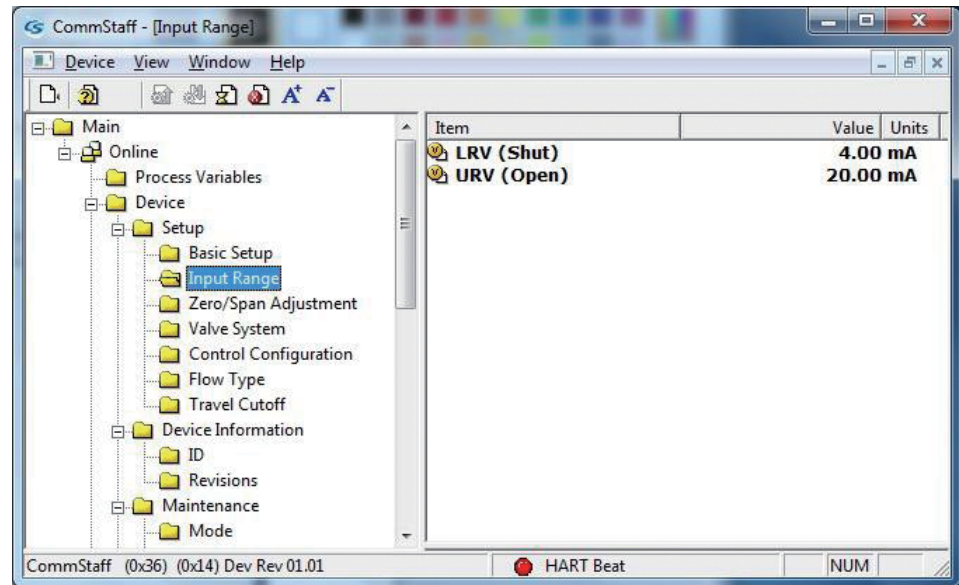


Click OK and set each of the PID parameters.



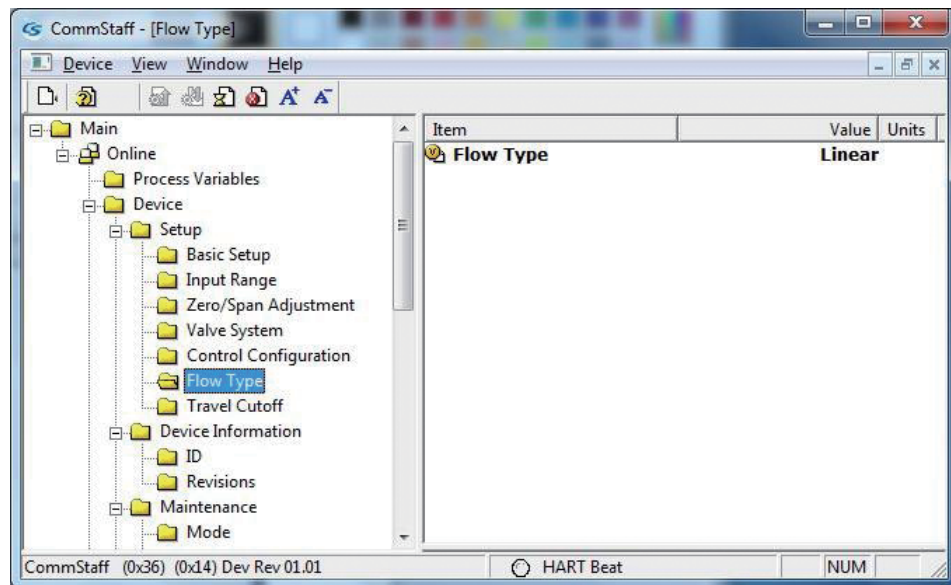
## 2-7. Input Range

Select [Device] → [Setup] → [Input Range].



## 2-8. Flow Type

Select [Device] → [Setup] → [Flow Type].

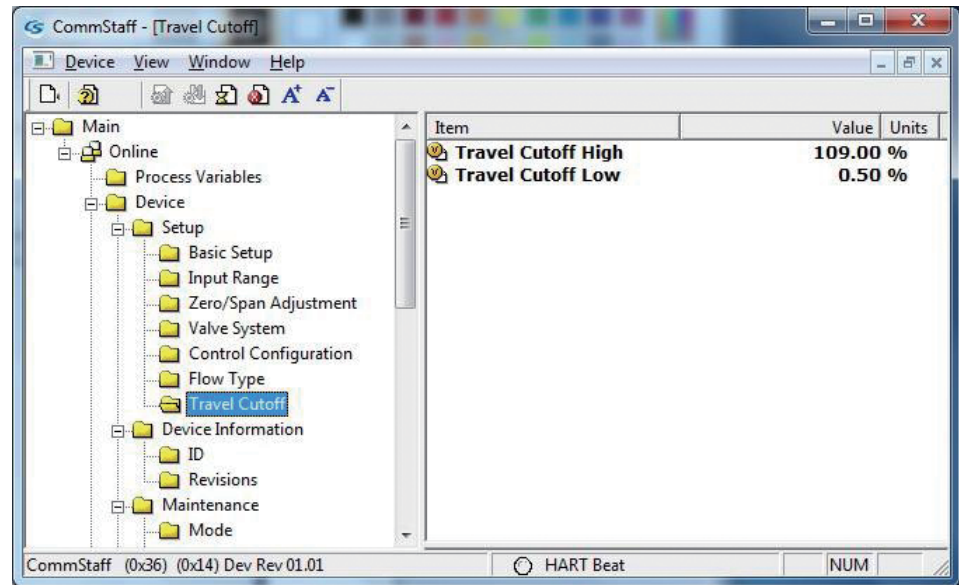


- If User-defined is selected, set User-defined Data separately.



## 2-9. Travel Cutoff

Select [Device] → [Setup] → [Travel Cutoff].

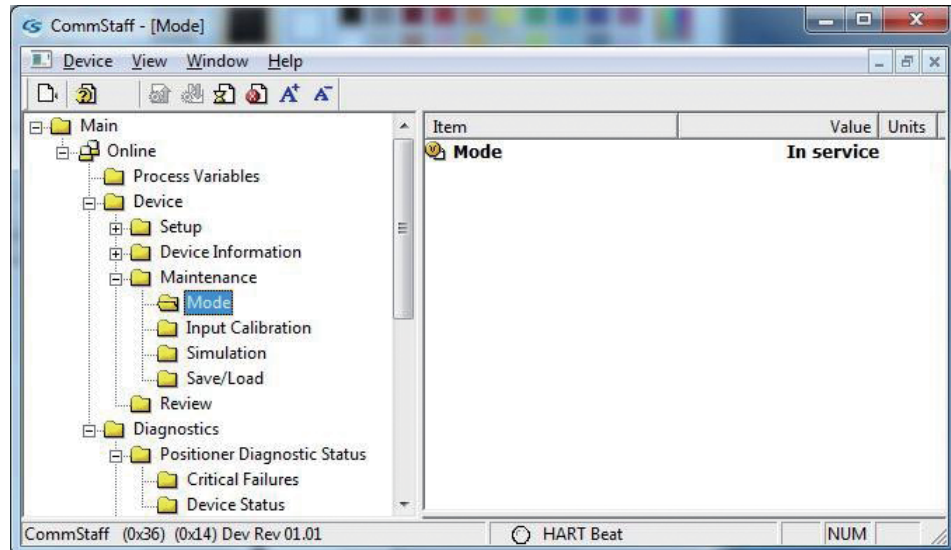


## Chapter 3. Maintenance

### 3-1. Mode (HART model only)

To change the settings, be sure to first change the mode to Out of service.

Select [Device] → [Maintenance] → [Mode].

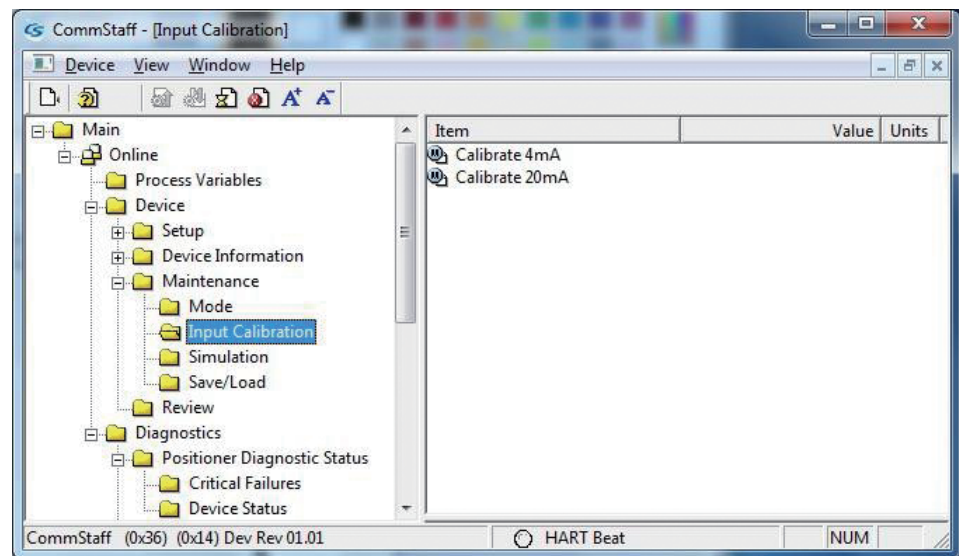


- When the Smart Positioner's power is turned on, it will go into In Service Mode.

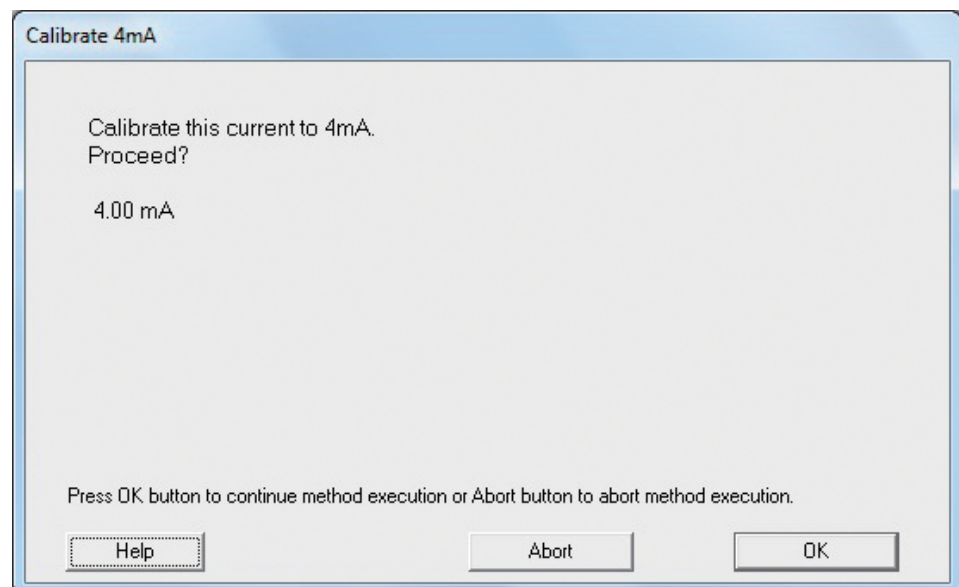
## 3-2. Input Calibration

Calibrates the input signal (4 or 20 mA).

Select [Device] → [Maintenance] → [Input Calibration].

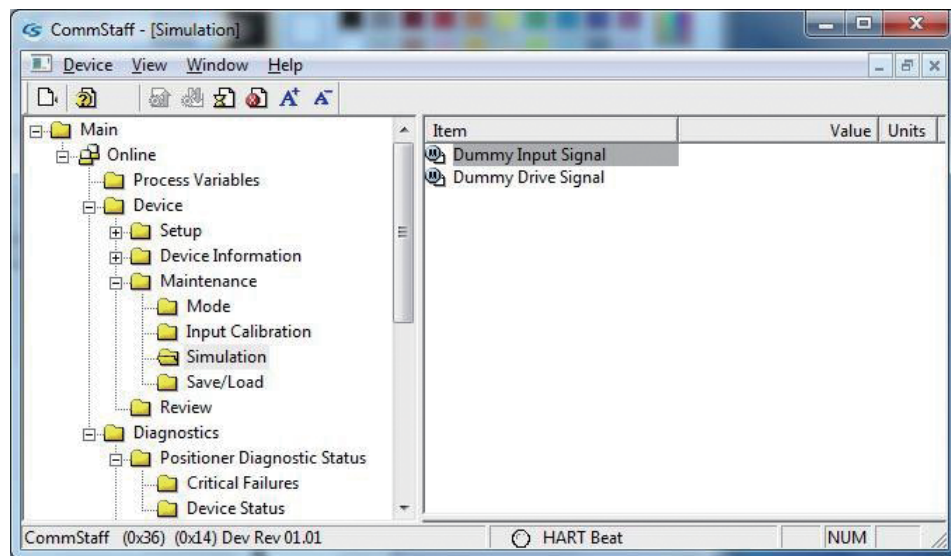


- Set the current input (controller output) to either 4 mA or 20 mA.

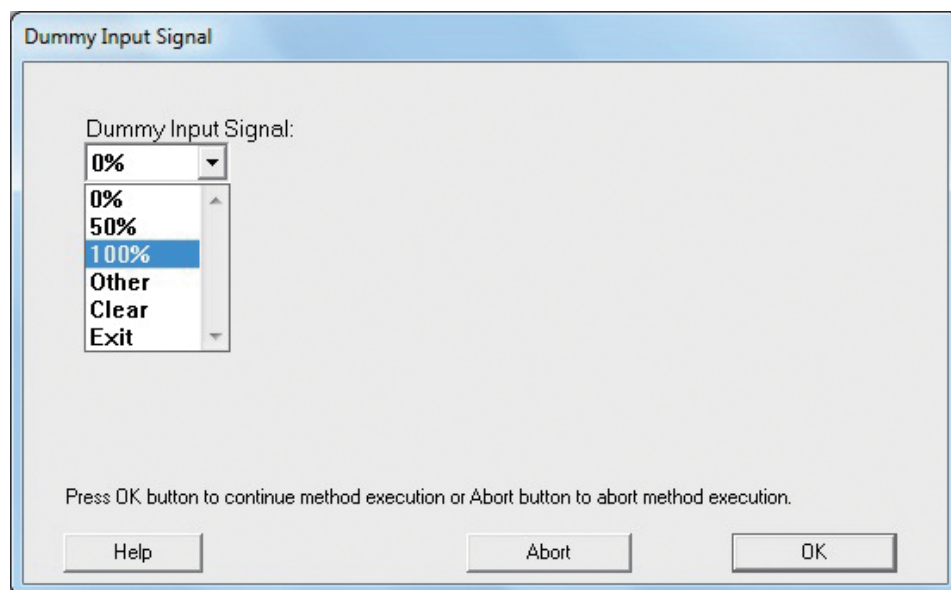


### 3-3. Dummy Input Signal

Select [Device] → [Maintenance] → [Dummy Input Signal].



Make sure that the loop is set to manual, and configure the dummy input signal in the window shown below.



Selecting 0 % and clicking OK will keep the dummy input signal at 0 %.

Selecting 50 % and clicking OK will keep the dummy input signal at 50 %.

Selecting 100 % and clicking OK will keep the dummy input signal at 100 %.

Selecting Other and clicking OK will allow any value to be set.

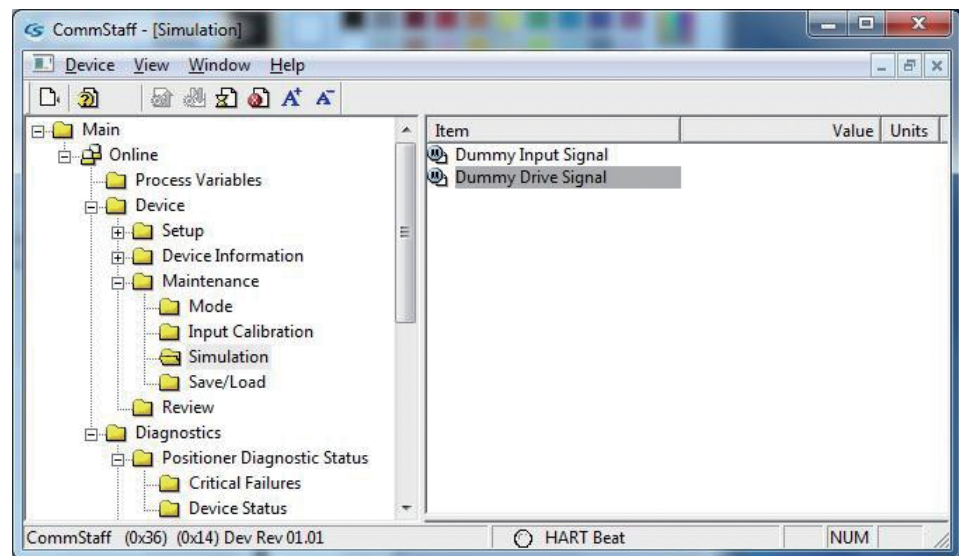
Selecting Clear and clicking OK will cancel the dummy input signal.

Selecting Exit and clicking OK will exit the settings window and return to the menu window.

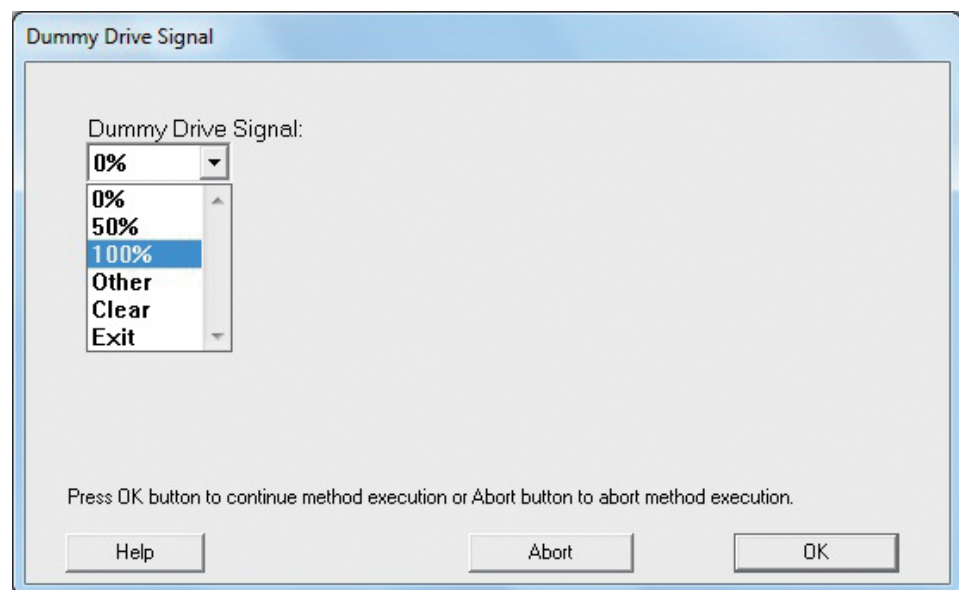
[Note] If Exit is set without clearing the Dummy Input Signal, the display may continue to show the settings window instead of returning to the Menu window. In such a case, select Clear once, click OK, select Exit, and click OK.

### 3-4. Dummy Drive Signal

Select [Device] → [Maintenance] → [Dummy Drive Signal].



Make sure that the loop is set to manual and configure the dummy EPM drive signal in the window shown below.



Selecting 0 % and clicking OK will keep the dummy EPM drive signal at 0 %.

Selecting 50 % and clicking OK will keep the dummy EPM drive signal at 50 %.

Selecting 100 % and clicking OK will keep the dummy EPM drive signal at 100 %.

Selecting Other and clicking OK will allow any value to be set.

Selecting Clear and clicking OK will cancel the dummy EPM drive signal.

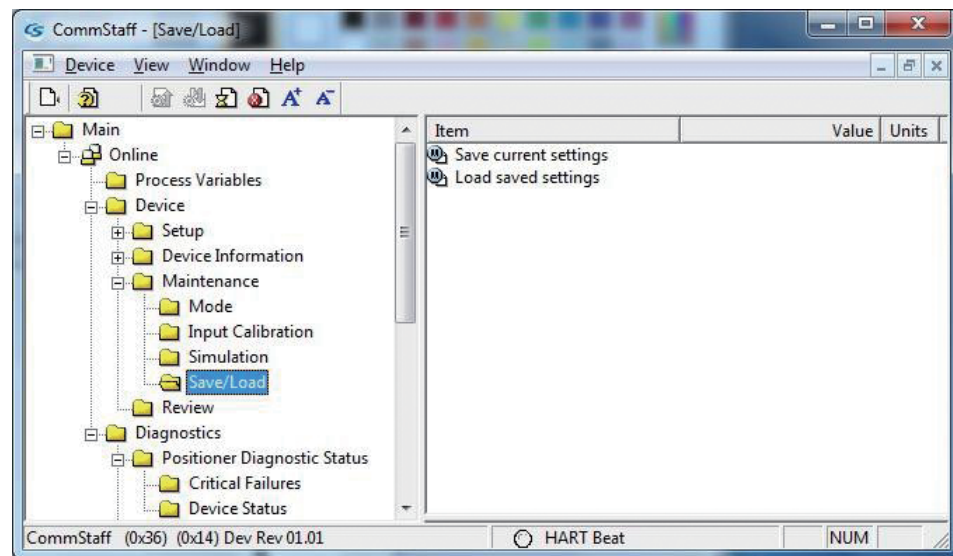
Selecting Exit and clicking OK will exit the settings window and return to the menu window.

[Note] If Exit is set without clearing the Dummy Input Signal, the display may continue to show the settings window instead of returning to the Menu window. In such a case, select Clear once, click OK, select Exit, and click OK.

### 3-5. Save/Load

Settings can be saved and previously saved settings can be loaded.

Select [Device] → [Maintenance] → [Save/Load].

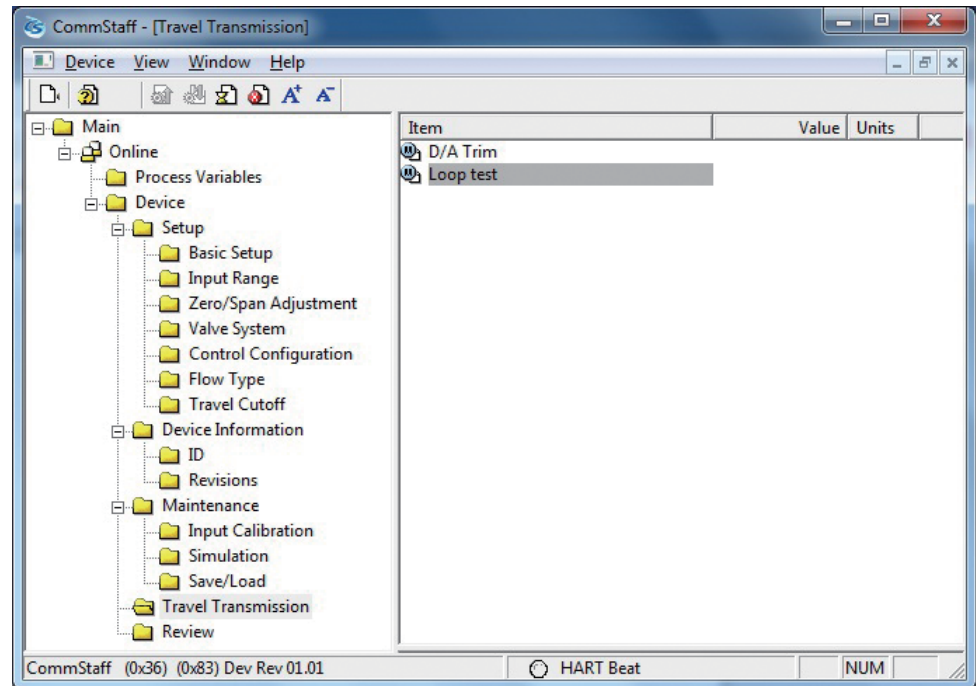


- When current settings are saved, the default settings will be changed.
- After loading saved settings, exit CommStaff and reboot.

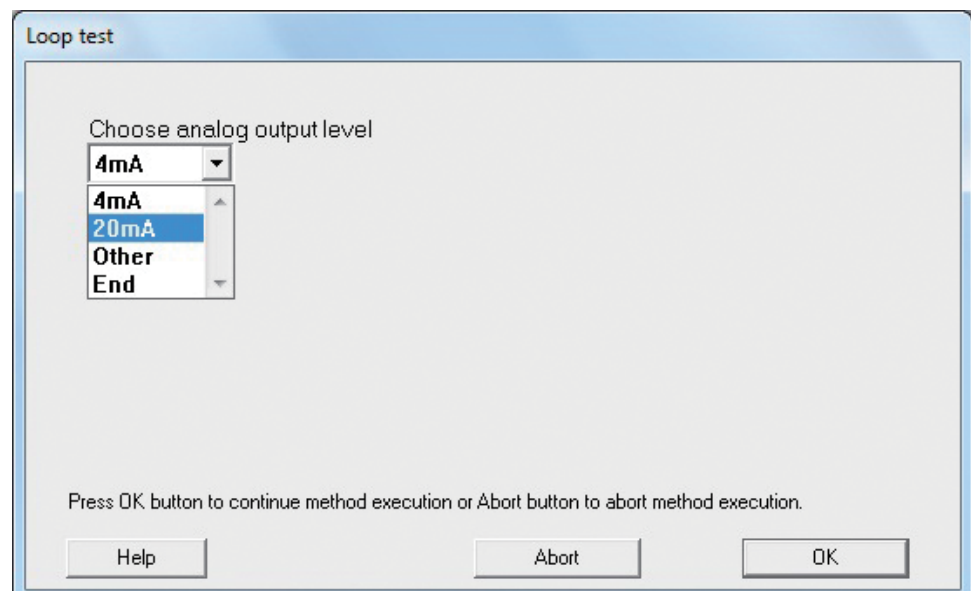
### 3-6. Loop test (SFN model only)

Select [Device] → [Travel Transmission] → [Loop test].

[Note] If the process is under automatic control and this operation is conducted, the output may fluctuate, resulting in a dangerous situation. Before performing this operation, be sure to switch the process control loop to manual mode.



Make sure the loop is set to manual, and configure the dummy output signal in the following window.



Selecting 4 mA and clicking OK will keep the output signal at 4 mA (0 %).

Selecting 20 mA and clicking OK will keep the output signal at 20 mA (100 %).

Selecting Other and clicking OK will allow any value to be set.

Selecting End and clicking OK will display a notification that normal output mode is resuming.

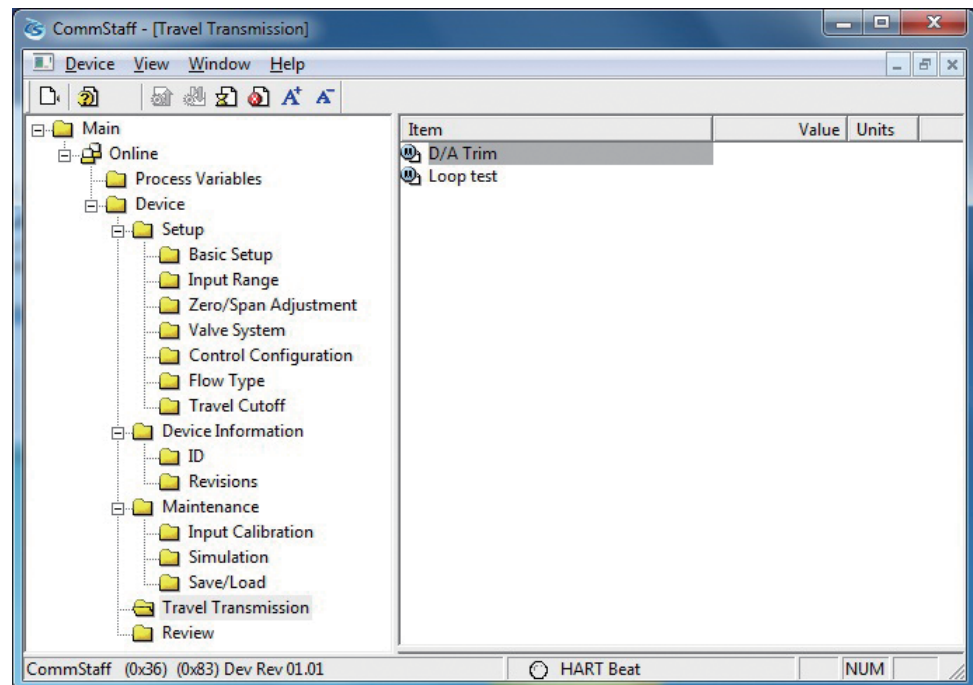


### 3-7. D/A Trim (SFN model only)

Calibrates the degree of opening transmission output (4 or 20 mA).

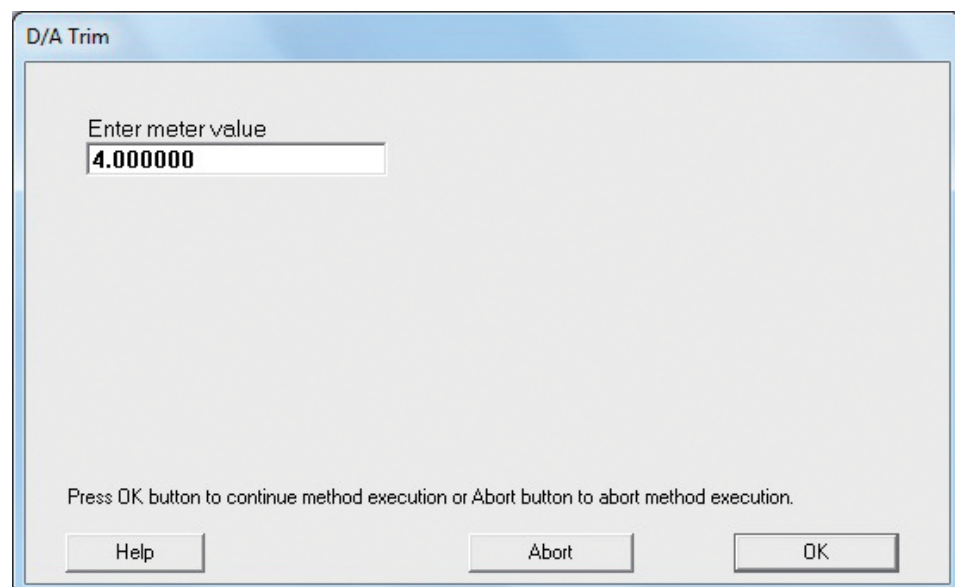
Select [Device] → [Travel Transmission] → [D/A Trim].

[Note] If the process is under automatic control and this operation is conducted, the output may fluctuate, resulting in a dangerous situation. Before performing this operation, be sure to switch the process control loop to manual mode.



Connect the ammeter and calibrate the degree of opening transmission output for 4 and 20 mA.

Make sure that the loop is set to manual, and input the ammeter reading into the settings window shown below.



[Note] For ordinary use it is not necessary to execute D/A trim, since it was calibrated before shipment. However, if the actual degree of opening and travel output differ, calibration should be done. In that case, use the following instruments:

- Precision ammeter, min. accuracy 0.03 % FS
- Precision resistor, 250  $\Omega \pm 0.005$  %

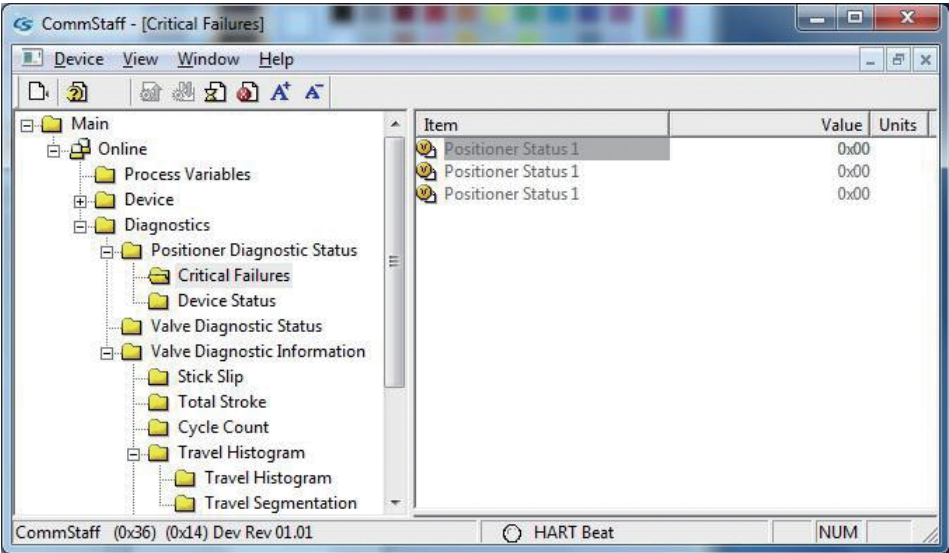


# Chapter 4. Diagnostics

## 4-1. Self-diagnostic Messages for HART model

### 4-1-1. Critical Failures

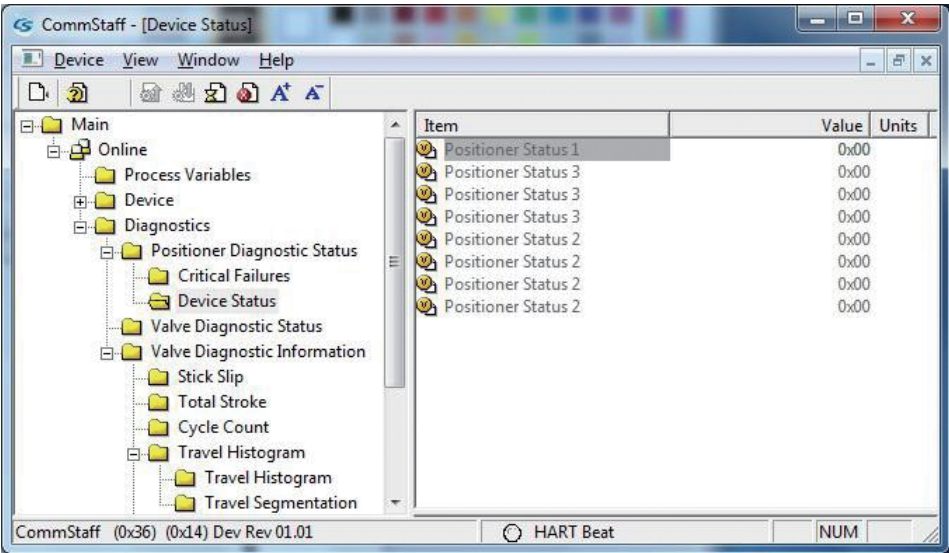
Select [Diagnostics] → [Positioner Diagnostic Status] → [Critical Failures].



To check the details concerning a displayed item, right-click the item and select the value to display.

### 4-1-2. Device Status

Select [Diagnostics] → [Positioner Diagnostic Status] → [Device Status].



To check the details concerning a displayed item, right-click the item and select the value to display.

## List of Self-Diagnostic Messages

Message	Meaning	Correction
<b>Critical failure</b>		
VTD FAULT	Valve position sensor problem.Feedback lever is detached or has turned beyond the allowable turning angle ( $\pm 20$ degrees).	Check if feedback lever is detached or if it is still within the permissible turning angle.
LOW IIN	Input signal is too low (3.8 mA or lower).	Provide an input signal of at least 3.8 mA.
NVM FAULT	Non-volatile memory problem.	Contact the appropriate personnel.
RAM FAULT	RAM error	Contact the appropriate personnel.
ROM FAULT	ROM error	Contact the appropriate personnel.
A/D FAULT	Analog/digital conversion problem.	Contact the appropriate personnel.
<b>Status</b>		
OVER TEMP	The detected internal temperature of the device is below $-45^{\circ}\text{C}$ or above $85^{\circ}\text{C}$ .	Change the operating conditions so that the temperature is within the specified range of $-40$ to $80^{\circ}\text{C}$ . If the operating conditions are already within the specified values, there may be a sensor malfunction.
SIMULATION MODE	Dummy input signal from SFC/ HART.	Cancel the dummy input signal.
	Dummy EPM drive signal from SFC.	Cancel the dummy EPM drive signal.
OUTPUT MODE	Dummy output signal from SFC.	Cancel the dummy output signal.
ALL SETTINGS RESET	Settings have been reset to default values.	Set actuator type and other parameters before use.
EXT SWITCH ACTIVE	External zero/span adjustment is being made.	Release the external Zero-span adjustment screw.
HI/LO EPM OUT	Electropneumatic module drive signal is outside normal range. Possible causes: <ul style="list-style-type: none"> <li>• No air is being supplied</li> <li>• Valve is closed</li> <li>• Galling of valve stem</li> <li>• Clogged nozzle</li> <li>• Clogged orifice</li> </ul>	<ul style="list-style-type: none"> <li>• Check air supply pressure</li> <li>• Confirm A/M switch is Auto</li> <li>• Clean air nozzle</li> <li>• Clean orifice</li> <li>• Adjust the EPM balance</li> </ul>
TRAVEL CUT OFF	SVP is forced fully opened or closed.	<ul style="list-style-type: none"> <li>• Apply an input signal above the forced fully shut valve or below the forced fully open valve.</li> <li>• Use the SFC to check and/or adjust the forced fully open/close values (%).</li> </ul>

## Control valve diagnostic messages when files have been saved

Saved data are shown in hexadecimal notation. Check the messages according to the following table:

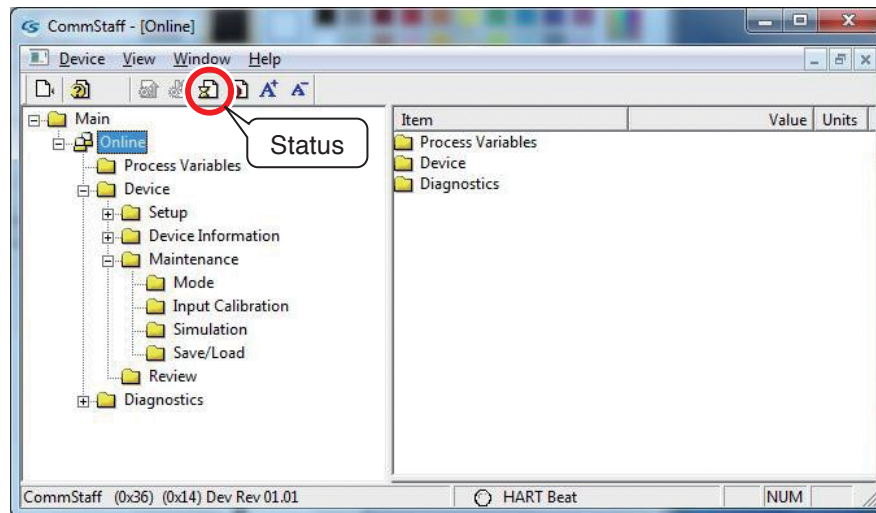
For example, when Positioner Status 1 is 0x03:

The messages "bit0:VTD FAULT" and "bit1: LO IIN" are shown.

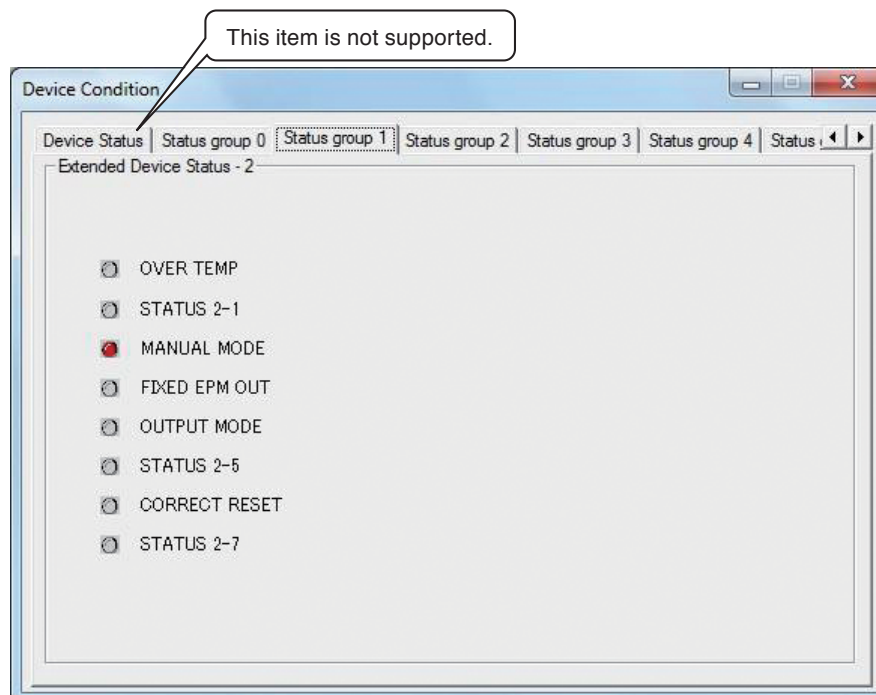
Status	bit	Alarm Message
Positioner Status 1	bit0	VTD FAULT
	bit1	LO IIN
	bit2	—
	bit3	—
	bit4	—
	bit5	RAM FAULT
	bit6	ROM FAULT
	bit7	—
Positioner Status 2	bit0	OVER TEMP
	bit1	—
	bit2	MANUAL MODE
	bit3	FIXED EPM OUT
	bit4	—
	bit5	—
	bit6	ALL SETTINGS RESET
	bit7	—
Positioner Status 3	bit0	—
	bit1	EXT ZERO ACTIVE
	bit2	HI/LO EPM OUT
	bit3	TARAVEL CUTOFF
	bit4	—
	bit5	—
	bit6	—
	bit7	—

## 4-2. Self-diagnostic Messages for SFN model

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



For example, if the dummy input signal has been set up, the MANUAL MODE button will be lit red. (It takes some time for the status group items to be displayed.)



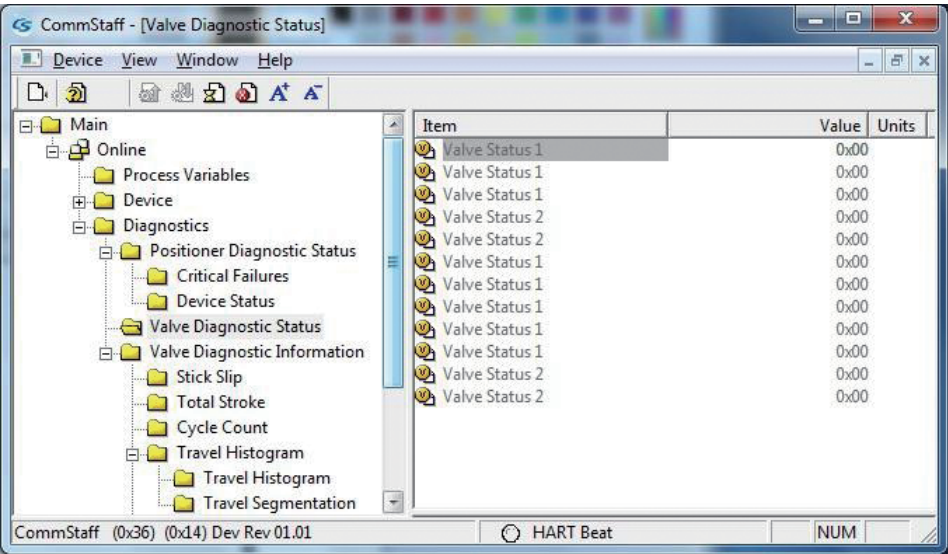
[Note] Items shown in "STATUS X-Y" format (STATUS 2-1, etc.) are unknown errors.

## List of Self-Diagnostic Messages

Message	Meaning	Correction
<b>Critical failure</b>		
VTD FAULT	Valve position sensor problem. Feedback lever is detached or has turned beyond the allowable turning angle ( $\pm 20$ degrees).	Check if feedback lever is detached or if it is still within the permissible turning angle.
LOW IIN	Input signal is too low (3.8 mA or lower).	Provide an input signal of at least 3.8 mA.
NVM FAULT	Non-volatile memory problem.	Contact the appropriate personnel.
RAM FAULT	RAM error	Contact the appropriate personnel.
ROM FAULT	ROM error	Contact the appropriate personnel.
A/D FAULT	Analog/digital conversion problem.	Contact the appropriate personnel.
<b>Device status</b>		
OVER TEMP	The detected internal temperature of the device is below $-45^{\circ}\text{C}$ or above $85^{\circ}\text{C}$ .	Change the operating conditions so that the temperature is within the specified range of $-40$ to $80^{\circ}\text{C}$ . If the operating conditions are already within the specified values, there may be a sensor malfunction.
MANUAL MODE	Dummy input signal from SFC/ HART.	Cancel the dummy input signal.
FIXED EPM OUT	Dummy EPM drive signal from SFC.	Cancel the dummy EPM drive signal.
OUTPUT MODE	Dummy output signal from SFC.	Cancel the dummy output signal.
CORRECT RESET	Settings have been reset to default values.	Set actuator type and other parameters before use.
EXT SWITCH ACTIVE	External zero/span adjustment is being made.	Release the external Zero-span adjustment screw.
HI/LO EPM OUT	Electropneumatic module drive signal is outside normal range. Possible causes: <ul style="list-style-type: none"> <li>• No air is being supplied</li> <li>• Valve is closed</li> <li>• Galling of valve stem</li> <li>• Clogged nozzle</li> <li>• Clogged orifice</li> </ul>	<ul style="list-style-type: none"> <li>• Check air supply pressure</li> <li>• Confirm A/M switch is Auto</li> <li>• Clean air nozzle</li> <li>• Clean orifice</li> <li>• Adjust the EPM balance</li> </ul>
SHUT ON	SVP is forced fully opened or closed.	<ul style="list-style-type: none"> <li>• Apply an input signal above the forced fully shut valve or below the forced fully open valve.</li> <li>• Use the SFC to check and/or adjust the forced fully open/close values (%).</li> </ul>

4-3. Valve Diagnostic Status (HART model only)

Select [Diagnostics] → [Valve Diagnostics Status].



To check the details concerning a displayed item, right-click the item and select the value to display.

For details concerning control valve diagnostic messages, refer to the following table:

## List of valve diagnostic messages (HART model only)

Alarm Message	Contents
Stick Slip Alarm	Stick Slip alerts when the valve shows stick and slip movement.
Total Stroke Alarm	Total Stroke alerts when the totalized distance of the valve plug/stem stroke movement exceeds the threshold value.
Cycle Count Alarm	Cycle Count alerts when the number of control valve reverse operation cycles exceeds the threshold value.
0% Tvl Error + Alarm	0% Tvl Error + alerts when there is upward deviation between current 0% travel and initial 0% travel angle.
0% Tvl Error - Alarm	0% Tvl Error - alerts when there is downward deviation between current 0% angle and initial 0% travel angle.
Shut-Off Count Alarm	Shut-Off Count alerts when the totalized number of valve closure exceeds the threshold value.
Max Tvl Speed + Alarm	Max Tvl Speed + alerts when the maximum stem movement speed of upward direction in a day exceeds the threshold value.
Max Tvl Speed - Alarm	Max Tvl Speed - alerts when the maximum stem movement speed of downward direction in a day exceeds the threshold value.
Deviation + Alarm	Deviation + alerts when there is a plus deviation between current travel (%) and input signal (%).
Deviation - Alarm	Deviation - alerts when there is a minus deviation between current travel (%) and input signal (%).
Temp High Alarm	Temp High alerts when measured temperature exceeds high thresholds.
Temp Low Alarm	Temp Low alerts when measured temperature falls below low thresholds.

## Control valve diagnostic messages when files have been saved

Saved data are shown in hexadecimal notation. Check the messages according to the following table:

For example, when Positioner Status 1 is 0x03:

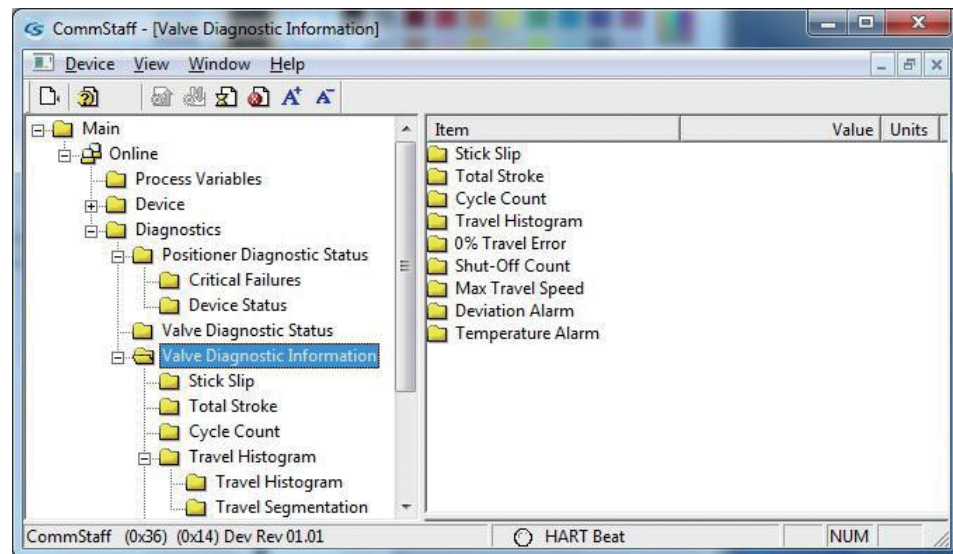
The messages "bit0: Total Stroke Alarm" and "bit1: Shut0Off Count Alarm" are shown.

Status	bit	Alarm Message
Valve Status 1	bit0	Total Stroke Alarm
	bit1	Shut-Off Count Alarm
	bit2	Cycle Count Alarm
	bit3	Max Travel Speed + Alarm
	bit4	Max Travel Speed - Alarm
	bit5	Stick Slip Alarm
	bit6	Deviation + Alarm
	bit7	Deviation - Alarm
Valve Status 2	bit0	Temp High Alarm
	bit1	Temp Low Alarm
	bit2	0% Travel Error + Alarm
	bit3	0% Travel Error - Alarm
	bit4	—
	bit5	—
	bit6	—
	bit7	—



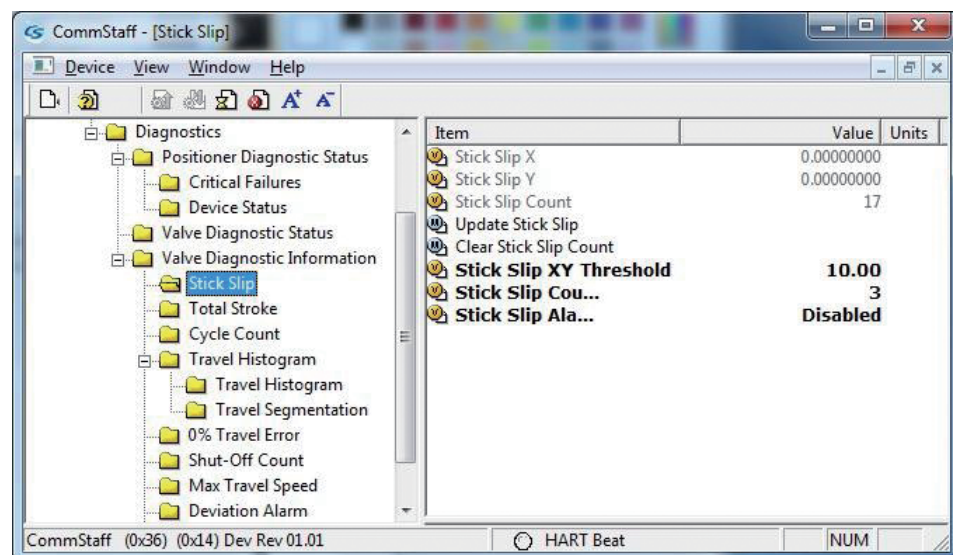
## 4-4. Valve Diagnostic Information (HART model only)

Select [Diagnostics] → [Valve Diagnostics Information].



### 4-4-1. Stick Slip

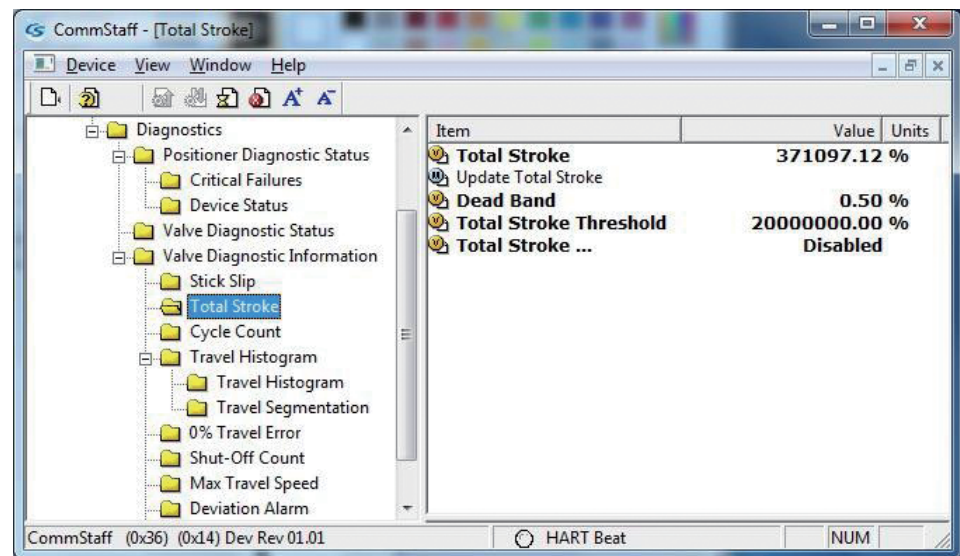
Select [Diagnostics] → [Valve Diagnostics Information] → [Stick Slip].





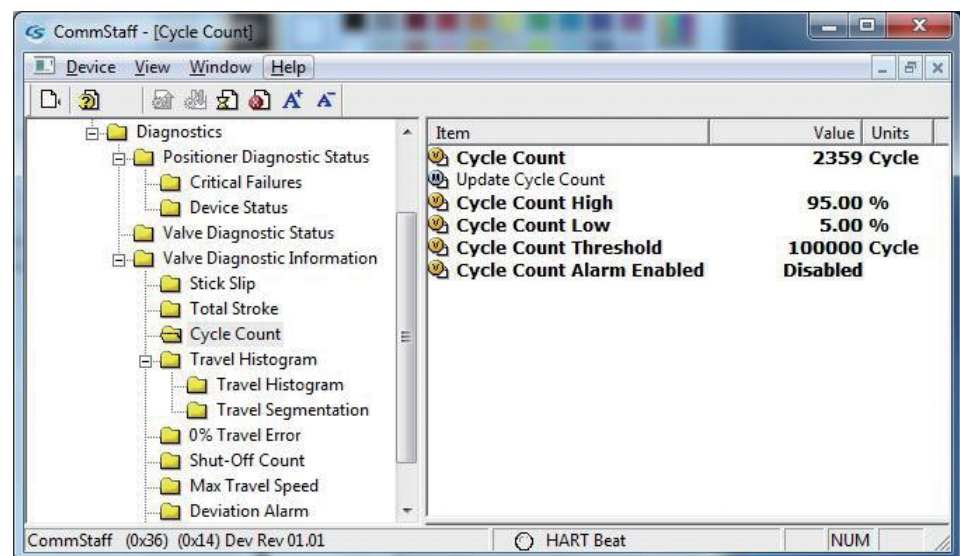
#### 4-4-2. Total Stroke

Select [Diagnostics] → [Valve Diagnostics Information] → [Total Stroke].



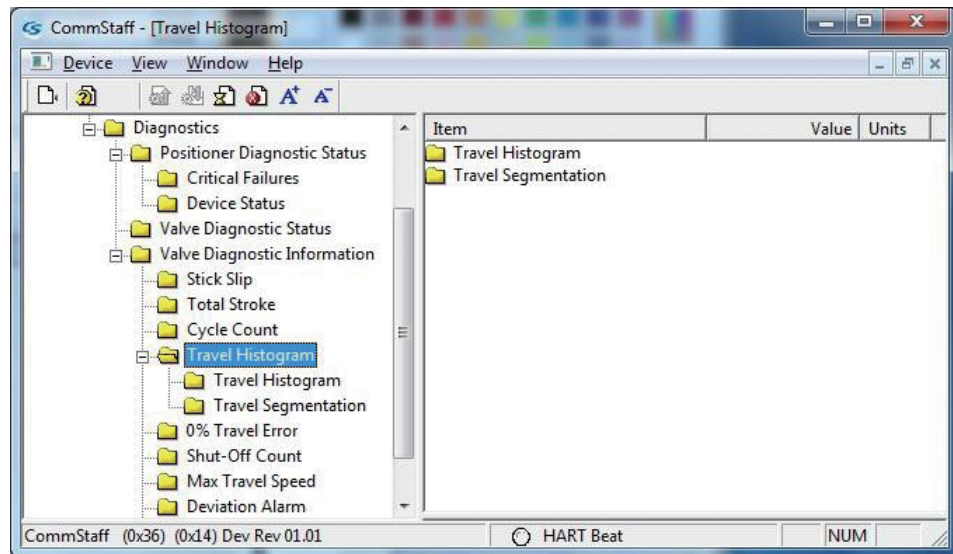
#### 4-4-3. Cycle Count

Select [Diagnostics] → [Valve Diagnostics Information] → [Cycle Count].



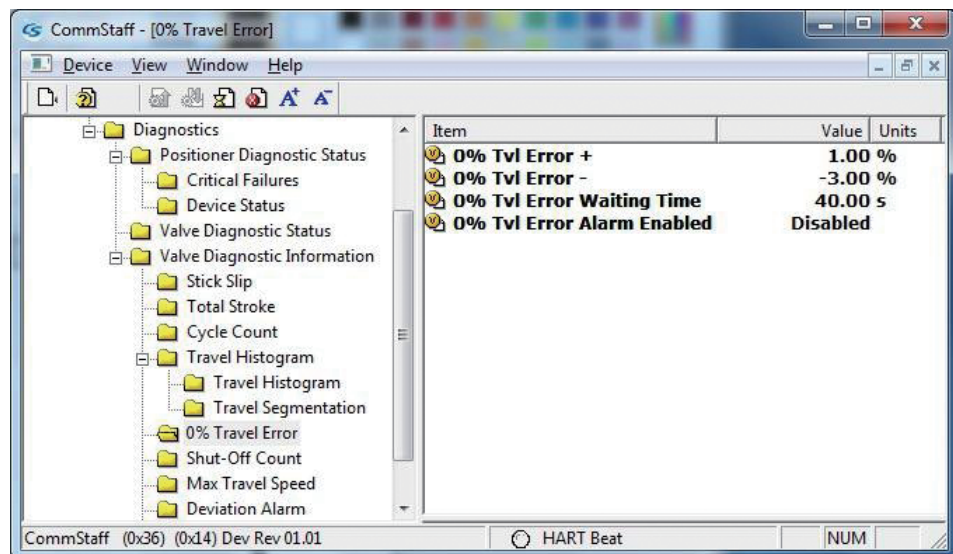
#### 4-4-4. Travel Histogram

Select [Diagnostics] → [Valve Diagnostics Information] → [Travel Histogram].



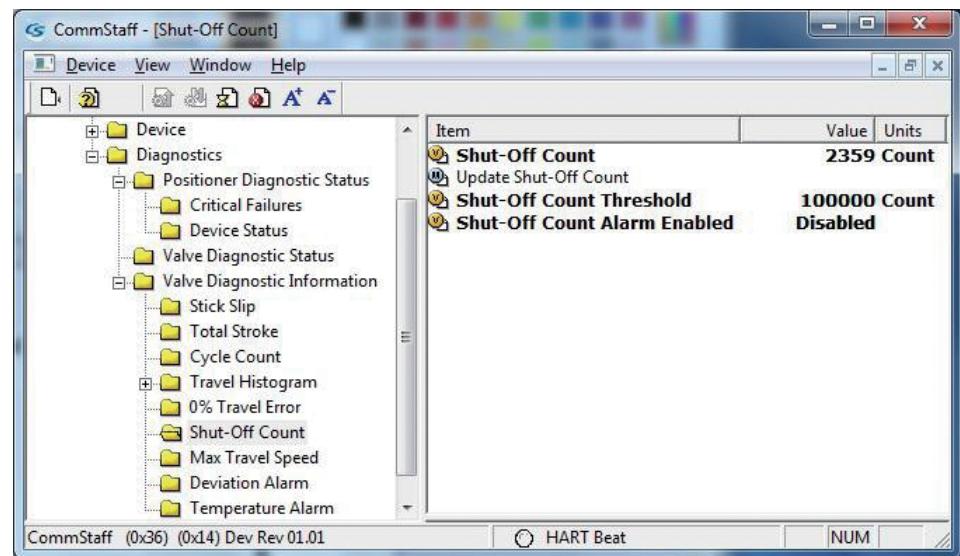
#### 4-4-5. 0% Travel Error

Select [Diagnostics] → [Valve Diagnostics Information] → [0% Travel Error].



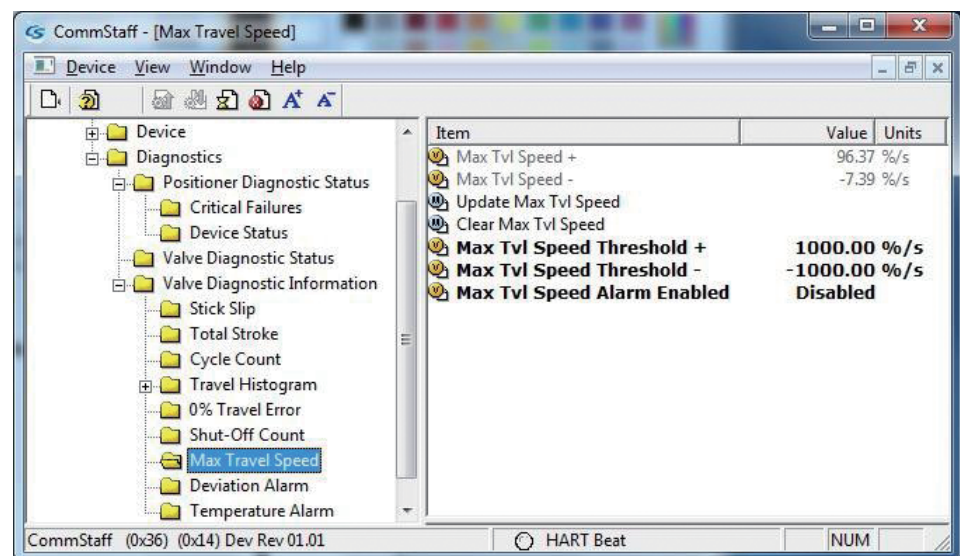
#### 4-4-6. Shut-Off Count

Select [Diagnostics] → [Valve Diagnostics Information] → [Shut-Off Count].



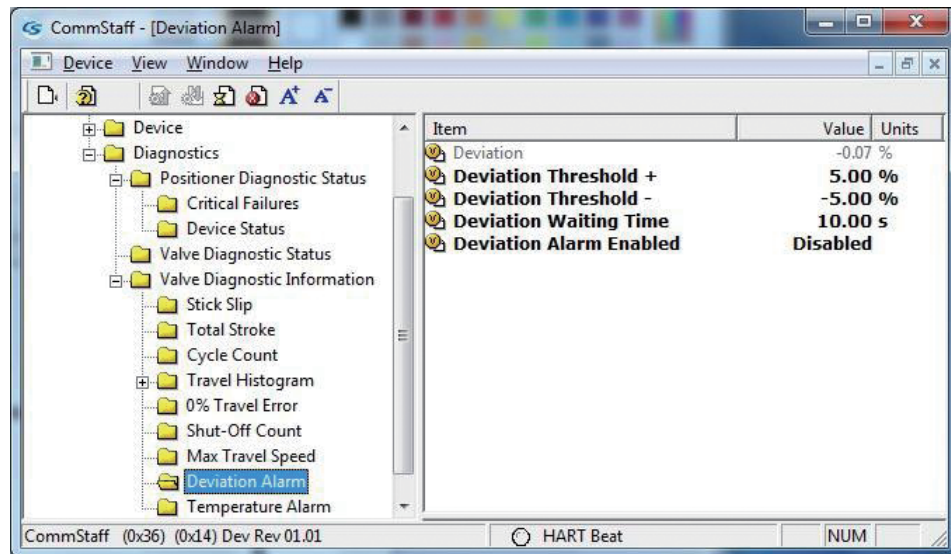
#### 4-4-7. Max Travel Speed

Select [Diagnostics] → [Valve Diagnostics Information] → [Max Travel Speed].



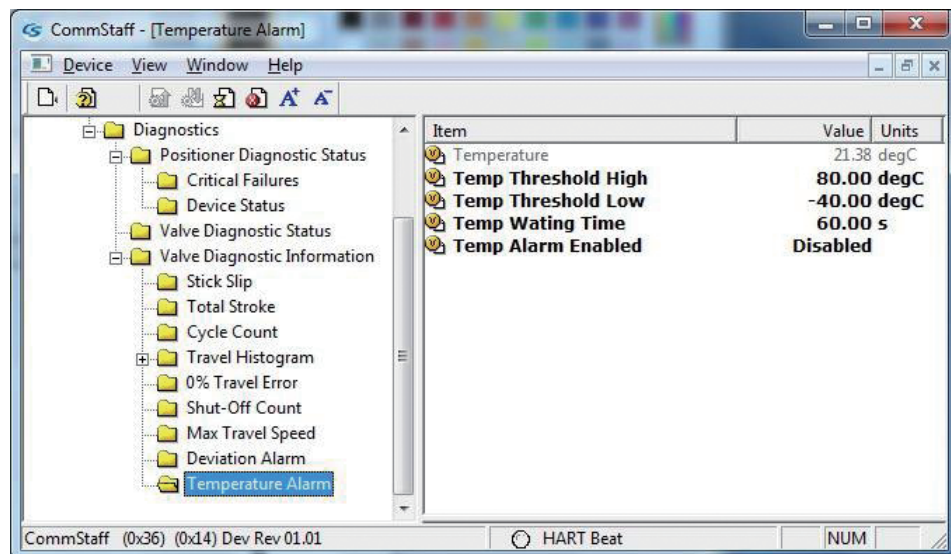
#### 4-4-8. Deviation Alarm

Select [Diagnostics] → [Valve Diagnostics Information] → [Deviation Alarm].



#### 4-4-9. Temp Alarm

Select [Diagnostics] → [Valve Diagnostics Information] → [Temp Alarm].



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Instruction Manual (Smart Valve Positioner Edition)

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