Field Communication Software CommStaff Model: CFS100

Instruction Manual (Smart Valve Positioner Edition)

Azbil Corporation

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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

CONTENTS

Chapter 1. Overview

1-1. Introduction

CommStaff is a tool for communicating with Azbil Corporation's 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 Azbil Corporation's 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 Azbil Corporation's proprietary SFN/DE communication protocol as well as the HART communication protocol.

* 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.

* The use of SFN communication changes the transmission signal, so be sure to switch the process control loop to manual mode beforehand.

* For known troubleshooting issues, refer to section 7.4 of CM2-CFS100-2001, the common edition 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)

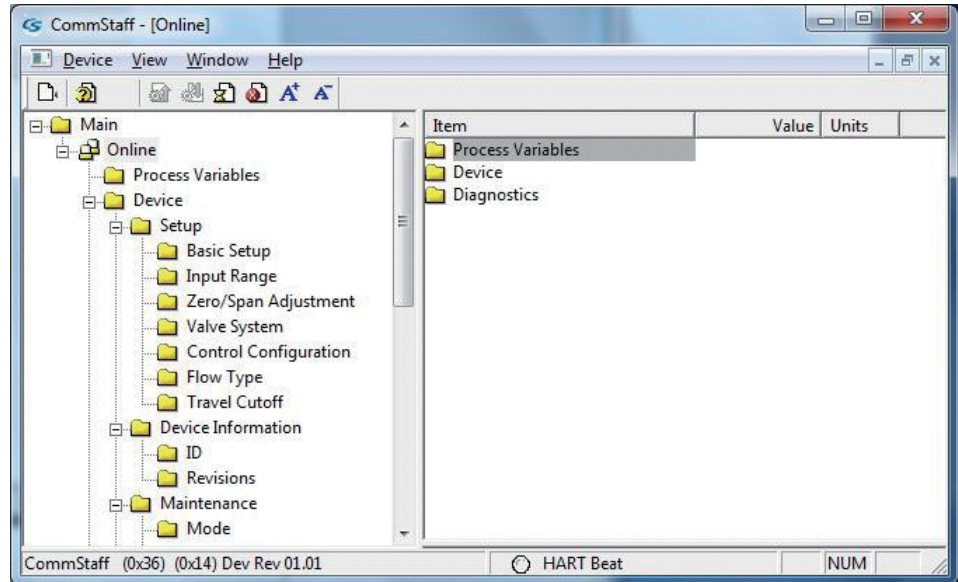## ● SFN model

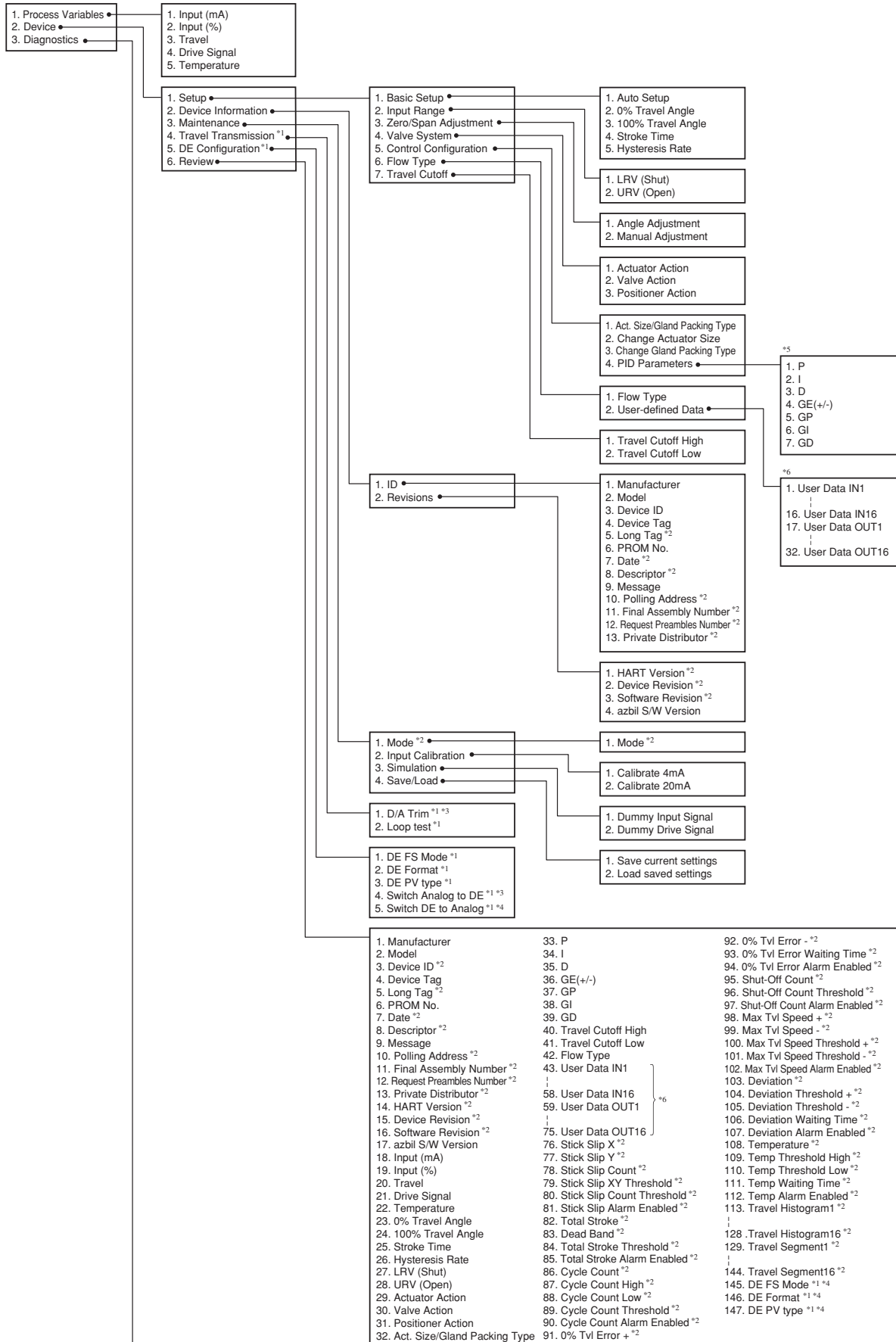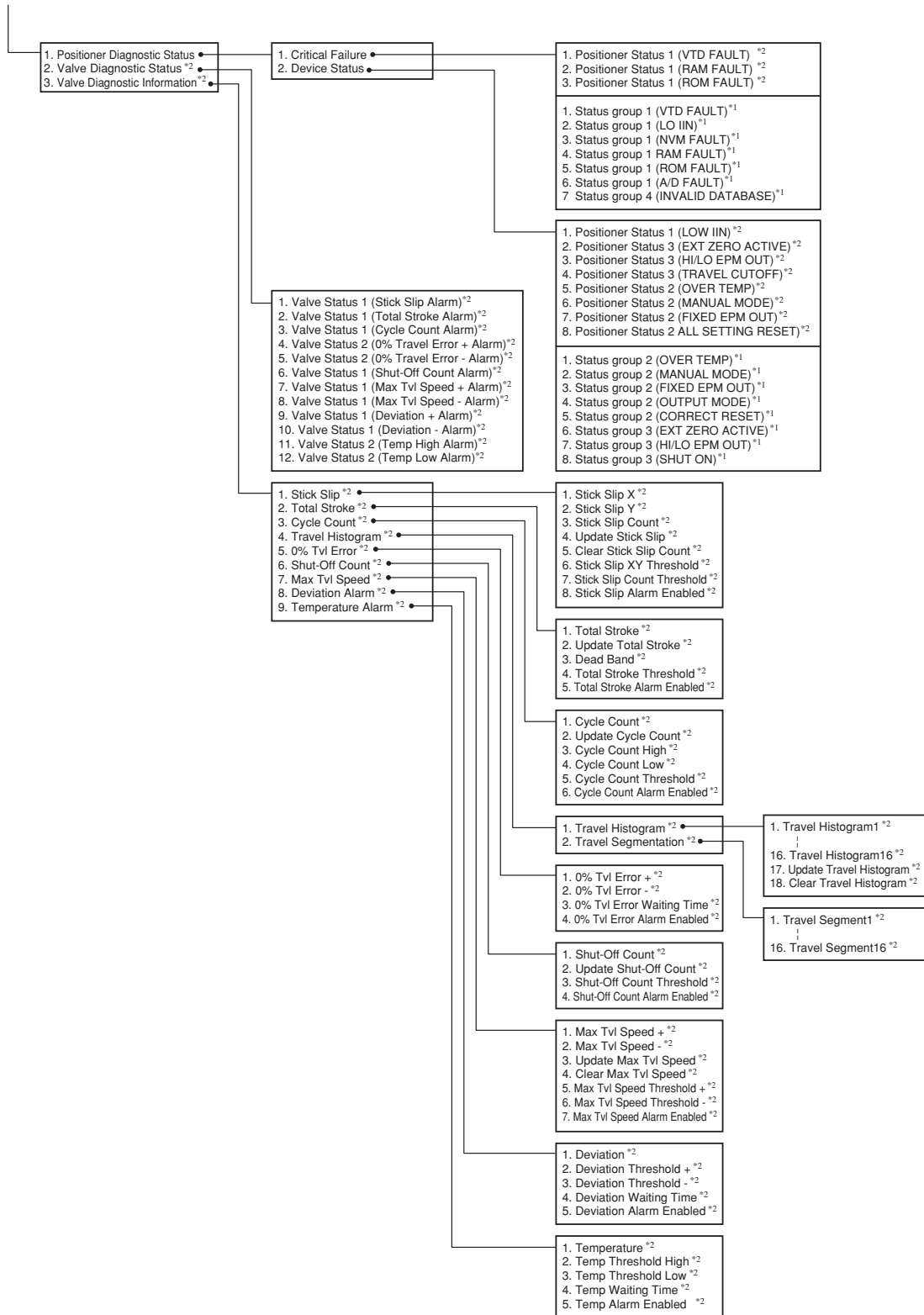| S/W Version	–V3.F (AVP300/301,AVP200/201) V5.0–V6.F (AVP302,AVP202) V4.5–V4.C, V3.E (SVX100) V4.5–V4.F, V6.0–V6.F (SVX102)

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.

Top level:
1. Process Variables
2. Device
3. Diagnostics

Process Variables:
1. Input (mA)
2. Input (%)
3. Travel
4. Drive Signal
5. Temperature

Device:
1. Setup
2. Device Information
3. Maintenance
4. Travel Transmission [*1]
5. DE Configuration [*1]
6. Review

Setup:
1. Basic Setup
2. Input Range
3. Zero/Span Adjustment
4. Valve System
5. Control Configuration
6. Flow Type
7. Travel Cutoff

Basic Setup:
1. Auto Setup
2. 0% Travel Angle
3. 100% Travel Angle
4. Stroke Time
5. Hysteresis Rate

Input Range:
1. LRV (Shut)
2. URV (Open)

Zero/Span Adjustment:
1. Angle Adjustment
2. Manual Adjustment

Valve System:
1. Actuator Action
2. Valve Action
3. Positioner Action

Control Configuration:
1. Act. Size/Gland Packing Type
2. Change Actuator Size
3. Change Gland Packing Type
4. PID Parameters

PID Parameters [*5]:
1. P
2. I
3. D
4. GE(+/-)
5. GP
6. GI
7. GD

Flow Type:
1. Flow Type
2. User-defined Data

User-defined Data [*6]:
1. User Data IN1
   ⋮
16. User Data IN16
17. User Data OUT1
   ⋮
32. User Data OUT16

Travel Cutoff:
1. Travel Cutoff High
2. Travel Cutoff Low

Device Information:
1. ID
2. Revisions

ID:
1. Manufacturer
2. Model
3. Device ID
4. Device Tag
5. Long Tag [*2]
6. PROM No.
7. Date [*2]
8. Descriptor [*2]
9. Message
10. Polling Address [*2]
11. Final Assembly Number [*2]
12. Request Preambles Number [*2]
13. Private Distributor [*2]

Revisions:
1. HART Version [*2]
2. Device Revision [*2]
3. Software Revision [*2]
4. azbil S/W Version

Maintenance:
1. Mode [*2]
2. Input Calibration
3. Simulation
4. Save/Load

Mode:
1. Mode [*2]

Input Calibration:
1. Calibrate 4mA
2. Calibrate 20mA

Travel Transmission:
1. D/A Trim [*1 *3]
2. Loop test [*1]

Simulation:
1. Dummy Input Signal
2. Dummy Drive Signal

DE Configuration:
1. DE FS Mode [*1]
2. DE Format [*1]
3. DE PV type [*1]
4. Switch Analog to DE [*1 *3]
5. Switch DE to Analog [*1 *4]

Save/Load:
1. Save current settings
2. Load saved settings

Review:
1. Manufacturer
2. Model
3. Device ID [*2]
4. Device Tag
5. Long Tag [*2]
6. PROM No.
7. Date [*2]
8. Descriptor [*2]
9. Message
10. Polling Address [*2]
11. Final Assembly Number [*2]
12. Request Preambles Number [*2]
13. Private Distributor [*2]
14. HART Version [*2]
15. Device Revision [*2]
16. Software Revision [*2]
17. azbil S/W Version
18. Input (mA)
19. Input (%)
20. Travel
21. Drive Signal
22. Temperature
23. 0% Travel Angle
24. 100% Travel Angle
25. Stroke Time
26. Hysteresis Rate
27. LRV (Shut)
28. URV (Open)
29. Actuator Action
30. Valve Action
31. Positioner Action
32. Act. Size/Gland Packing Type
33. P
34. I
35. D
36. GE(+/-)
37. GP
38. GI
39. GD
40. Travel Cutoff High
41. Travel Cutoff Low
42. Flow Type
43. User Data IN1
   ⋮
58. User Data IN16
59. User Data OUT1 [*6]
   ⋮
75. User Data OUT16
76. Stick Slip X [*2]
77. Stick Slip Y [*2]
78. Stick Slip Count [*2]
79. Stick Slip XY Threshold [*2]
80. Stick Slip Count Threshold [*2]
81. Stick Slip Alarm Enabled [*2]
82. Total Stroke [*2]
83. Dead Band [*2]
84. Total Stroke Threshold [*2]
85. Total Stroke Alarm Enabled [*2]
86. Cycle Count [*2]
87. Cycle Count High [*2]
88. Cycle Count Low [*2]
89. Cycle Count Threshold [*2]
90. Cycle Count Alarm Enabled [*2]
91. 0% Tvl Error + [*2]
92. 0% Tvl Error - [*2]
93. 0% Tvl Error Waiting Time [*2]
94. 0% Tvl Error Alarm Enabled [*2]
95. Shut-Off Count [*2]
96. Shut-Off Count Threshold [*2]
97. Shut-Off Count Alarm Enabled [*2]
98. Max Tvl Speed + [*2]
99. Max Tvl Speed - [*2]
100. Max Tvl Speed Threshold + [*2]
101. Max Tvl Speed Threshold - [*2]
102. Max Tvl Speed Alarm Enabled [*2]
103. Deviation [*2]
104. Deviation Threshold + [*2]
105. Deviation Threshold - [*2]
106. Deviation Waiting Time [*2]
107. Deviation Alarm Enabled [*2]
108. Temperature [*2]
109. Temp Threshold High [*2]
110. Temp Threshold Low [*2]
111. Temp Waiting Time [*2]
112. Temp Alarm Enabled [*2]
113. Travel Histogram1 [*2]
   ⋮
128. Travel Histogram16 [*2]
129. Travel Segment1 [*2]
   ⋮
144. Travel Segment16 [*2]
145. DE FS Mode [*1 *4]
146. DE Format [*1 *4]
147. DE PV type [*1 *4]

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1. Positioner Diagnostic Status
2. Valve Diagnostic Status *2
3. Valve Diagnostic Information *2

1. Critical Failure
2. Device Status

1. Positioner Status 1 (VTD FAULT) *2
2. Positioner Status 1 (RAM FAULT) *2
3. Positioner Status 1 (ROM FAULT) *2

1. Status group 1 (VTD FAULT) *1
2. Status group 1 (LO IIN) *1
3. Status group 1 (NVM FAULT) *1
4. Status group 1 RAM FAULT) *1
5. Status group 1 (ROM FAULT) *1
6. Status group 1 (A/D FAULT) *1
7. Status group 4 (INVALID DATABASE) *1

1. Positioner Status 1 (LOW IIN) *2
2. Positioner Status 3 (EXT ZERO ACTIVE) *2
3. Positioner Status 3 (HI/LO EPM OUT) *2
4. Positioner Status 3 (TRAVEL CUTOFF) *2
5. Positioner Status 2 (OVER TEMP) *2
6. Positioner Status 2 (MANUAL MODE) *2
7. Positioner Status 2 (FIXED EPM OUT) *2
8. Positioner Status 2 ALL SETTING RESET) *2

1. Valve Status 1 (Stick Slip Alarm)*2
2. Valve Status 1 (Total Stroke Alarm)*2
3. Valve Status 1 (Cycle Count Alarm)*2
4. Valve Status 2 (0% Travel Error + Alarm)*2
5. Valve Status 2 (0% Travel Error - Alarm)*2
6. Valve Status 1 (Shut-Off Count Alarm)*2
7. Valve Status 1 (Max Tvl Speed + Alarm)*2
8. Valve Status 1 (Max Tvl Speed - Alarm)*2
9. Valve Status 1 (Deviation + Alarm)*2
10. Valve Status 1 (Deviation - Alarm)*2
11. Valve Status 2 (Temp High Alarm)*2
12. Valve Status 2 (Temp Low Alarm)*2

1. Status group 2 (OVER TEMP) *1
2. Status group 2 (MANUAL MODE) *1
3. Status group 2 (FIXED EPM OUT) *1
4. Status group 2 (OUTPUT MODE) *1
5. Status group 2 (CORRECT RESET) *1
6. Status group 3 (EXT ZERO ACTIVE) *1
7. Status group 3 (HI/LO EPM OUT) *1
8. Status group 3 (SHUT ON) *1

1. Stick Slip *2
2. Total Stroke *2
3. Cycle Count *2
4. Travel Histogram *2
5. 0% Tvl Error *2
6. Shut-Off Count *2
7. Max Tvl Speed *2
8. Deviation Alarm *2
9. Temperature Alarm *2

1. Stick Slip X *2
2. Stick Slip Y *2
3. Stick Slip Count *2
4. Update Stick Slip *2
5. Clear Stick Slip Count *2
6. Stick Slip XY Threshold *2
7. Stick Slip Count Threshold *2
8. Stick Slip Alarm Enabled *2

1. Total Stroke *2
2. Update Total Stroke *2
3. Dead Band *2
4. Total Stroke Threshold *2
5. Total Stroke Alarm Enabled *2

1. Cycle Count *2
2. Update Cycle Count *2
3. Cycle Count High *2
4. Cycle Count Low *2
5. Cycle Count Threshold *2
6. Cycle Count Alarm Enabled *2

1. Travel Histogram *2
2. Travel Segmentation *2

1. Travel Histogram1 *2
    ┊
16. Travel Histogram16 *2
17. Update Travel Histogram *2
18. Clear Travel Histogram *2

1. Travel Segment1 *2
    ┊
16. Travel Segment16 *2

1. 0% Tvl Error + *2
2. 0% Tvl Error - *2
3. 0% Tvl Error Waiting Time *2
4. 0% Tvl Error Alarm Enabled *2

1. Shut-Off Count *2
2. Update Shut-Off Count *2
3. Shut-Off Count Threshold *2
4. Shut-Off Count Alarm Enabled *2

1. Max Tvl Speed + *2
2. Max Tvl Speed - *2
3. Update Max Tvl Speed *2
4. Clear Max Tvl Speed *2
5. Max Tvl Speed Threshold + *2
6. Max Tvl Speed Threshold - *2
7. Max Tvl Speed Alarm Enabled *2

1. Deviation *2
2. Deviation Threshold + *2
3. Deviation Threshold - *2
4. Deviation Waiting Time *2
5. Deviation Alarm Enabled *2

1. Temperature *2
2. Temp Threshold High *2
3. Temp Threshold Low *2
4. Temp Waiting Time *2
5. Temp Alarm Enabled *2

*1 Not displayed if HART communications is selected.
*2 Not displayed if SFN communications is selected.
*3 Not displayed if DE communication is selected.
*4 Valid (displayed) if DE communication is selected.
*5 Displayed when Actuator Size is Param 0.
*6 Displayed when Flow Type is User-defined.

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].
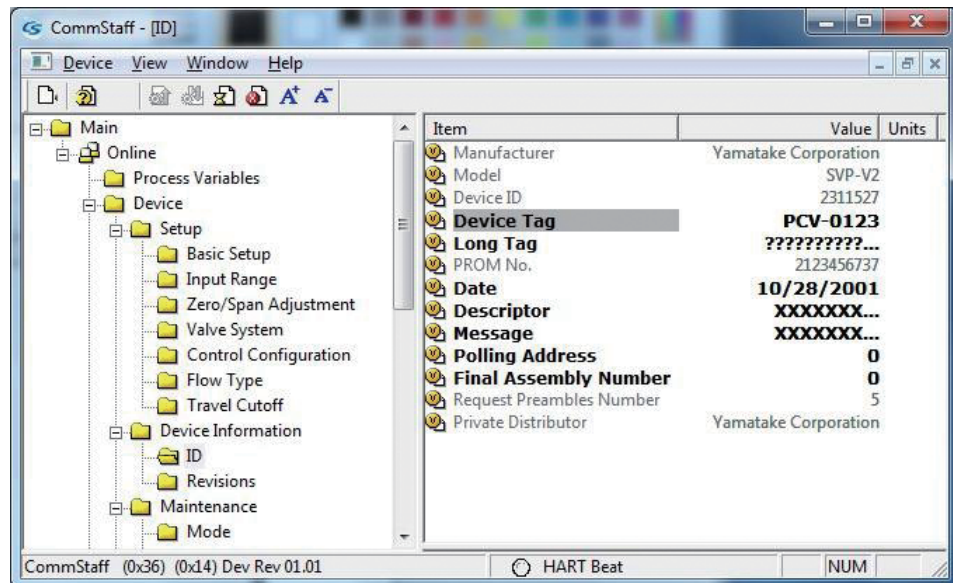
Double-clicking Tag displays the settings screen. On this screen, set the Tag and click the Set button. The tag is highlighted in yellow. Click the Send button to send the new Tag to the transmitter.
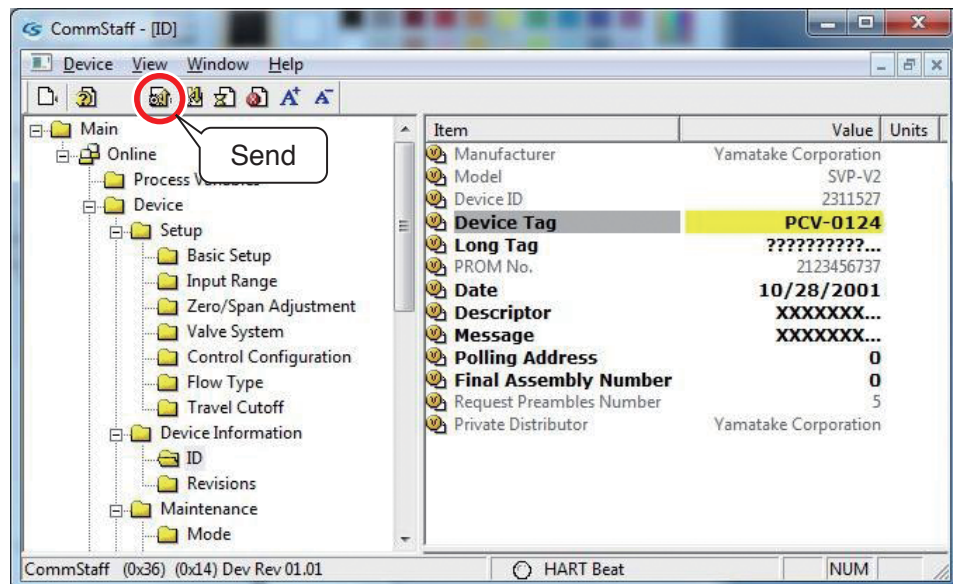
2-3. Auto Setup

Select [Device] → [Setup] → [Basic Setup] → [Auto Setup].
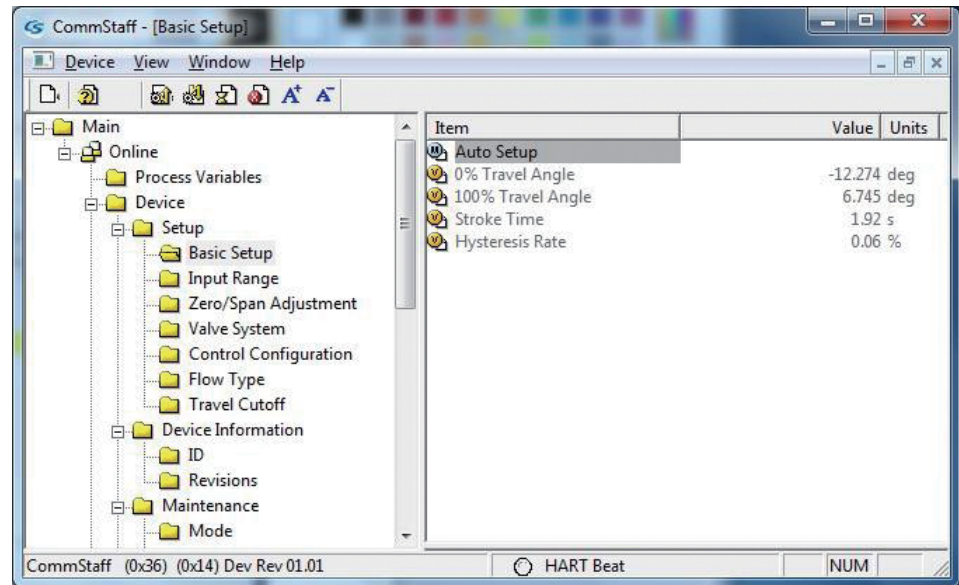
- In the HART version if the mode is In Service, a warning alerts the user to switch it to Out of service.
  To change the mode to Out of service, select [Device] → [Maintenance] → [Mode].

- 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.

- When the format of degree of opening transmission output is DE, the "Stroke Time is fixed at 100s" and the "Hysteresis Rate is fixed at 0%."

2-4.   Zero/Span Adjustment

Execute zero/span adjustment to set the degree of valve opening.

Select [Device] → [Setup] → [Zero/Span Adjustment].
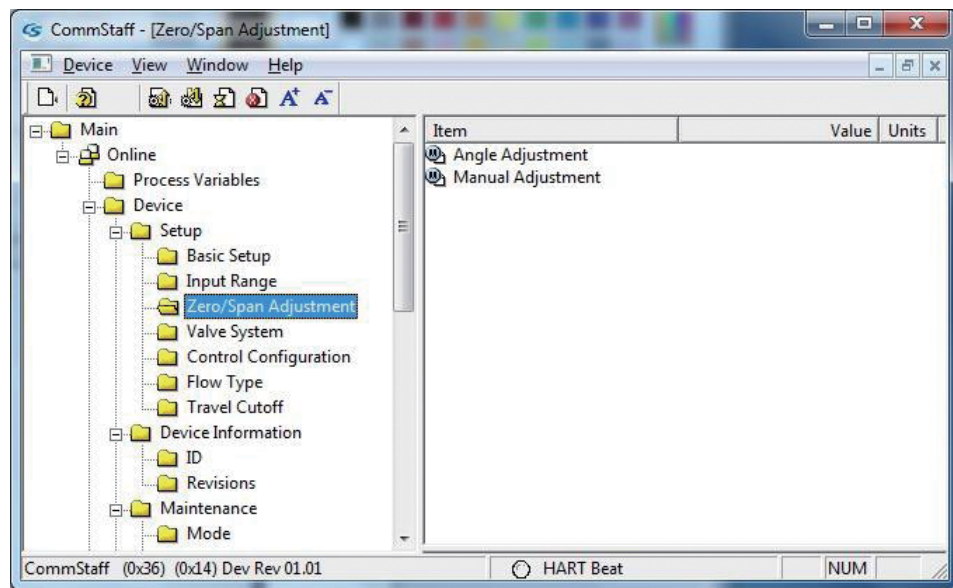
2-4-1. Angle Adjustment

Adjusts the angle for zero/span.

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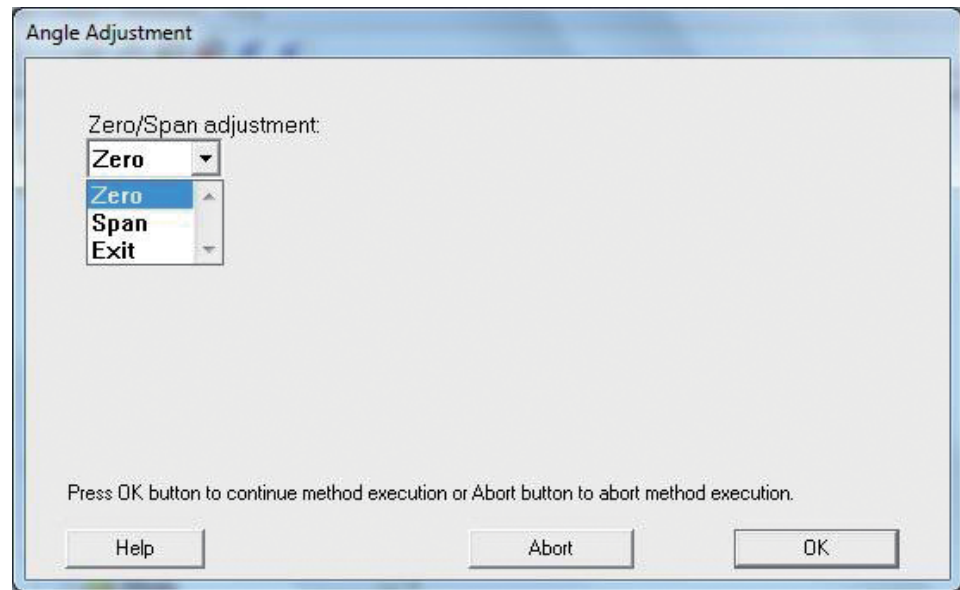
● Zero adjustment

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]
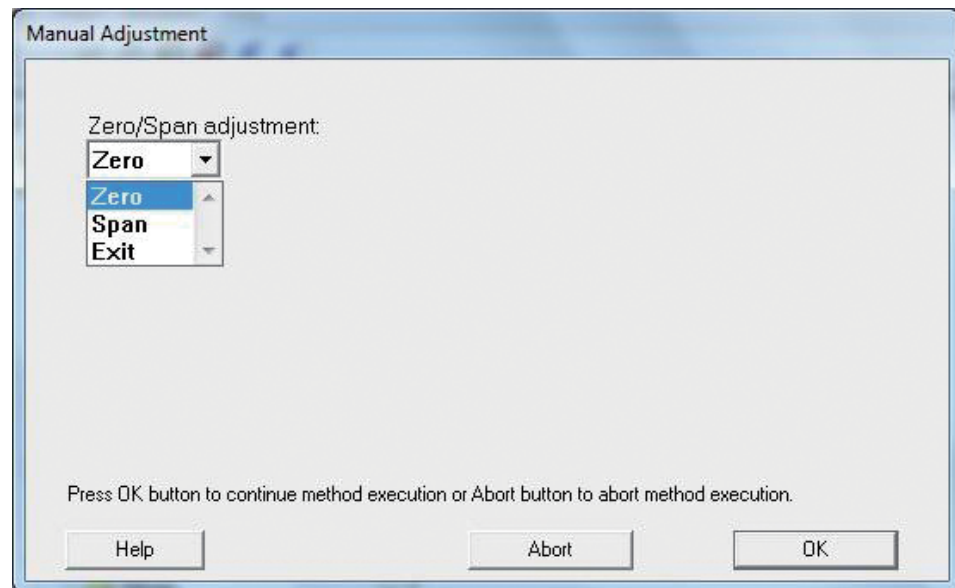
● Zero adjustment

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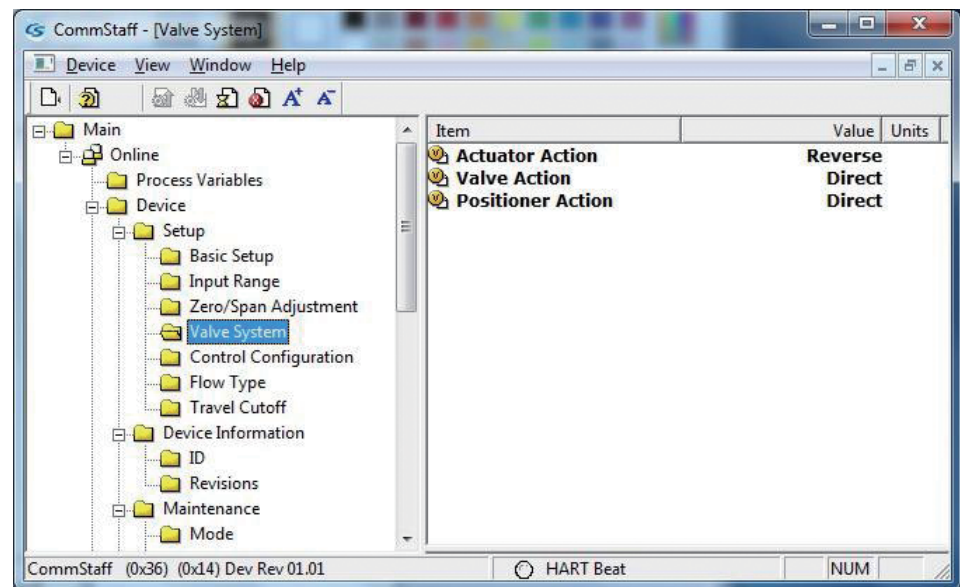
- Select Direct or Reverse for Actuator Action, Valve Action, and Positioner Action.

2-6. Control Configuration

Select [Device] → [Setup] → [Control Configuration].
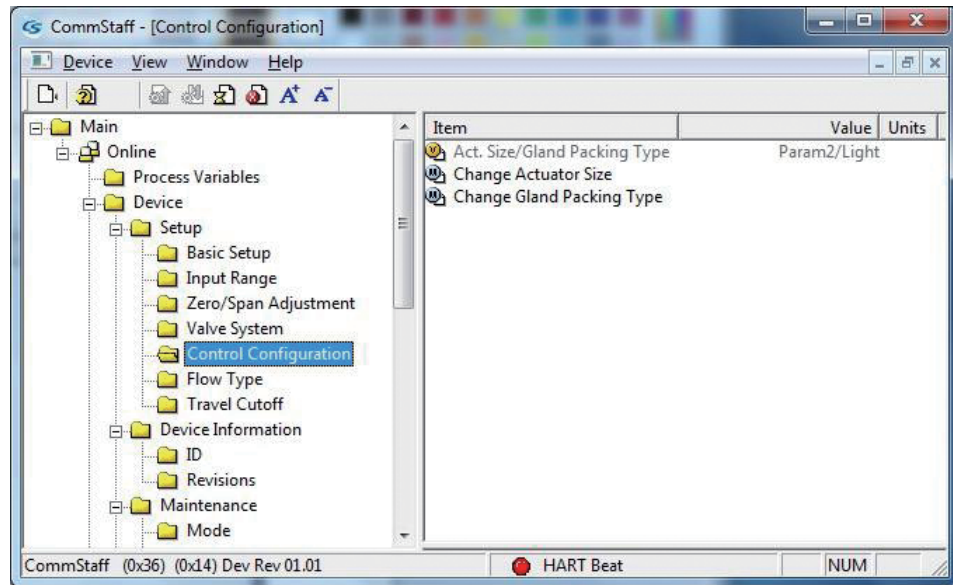
- Set Actuator Size and Gland Packing Type.

- 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.
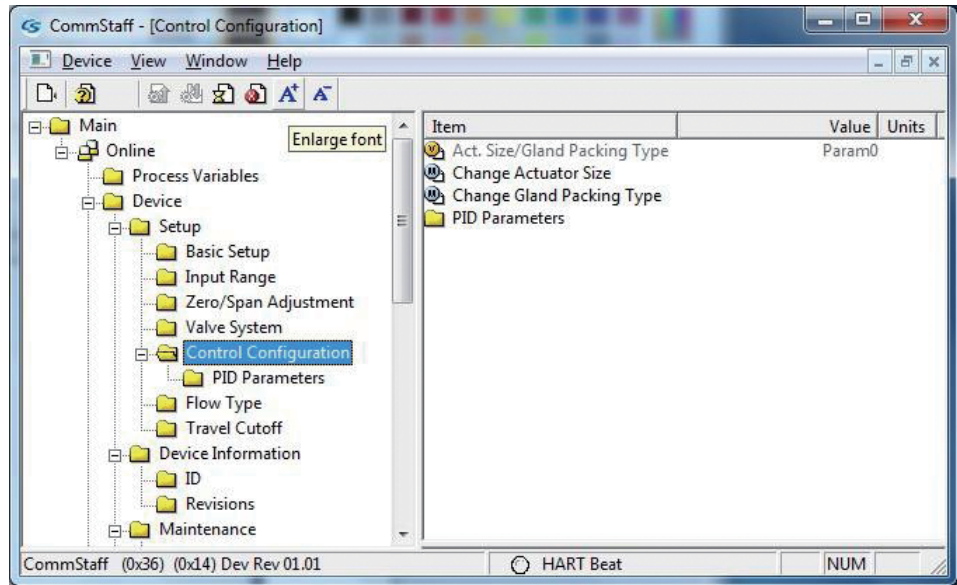
Set the PID Parameters.
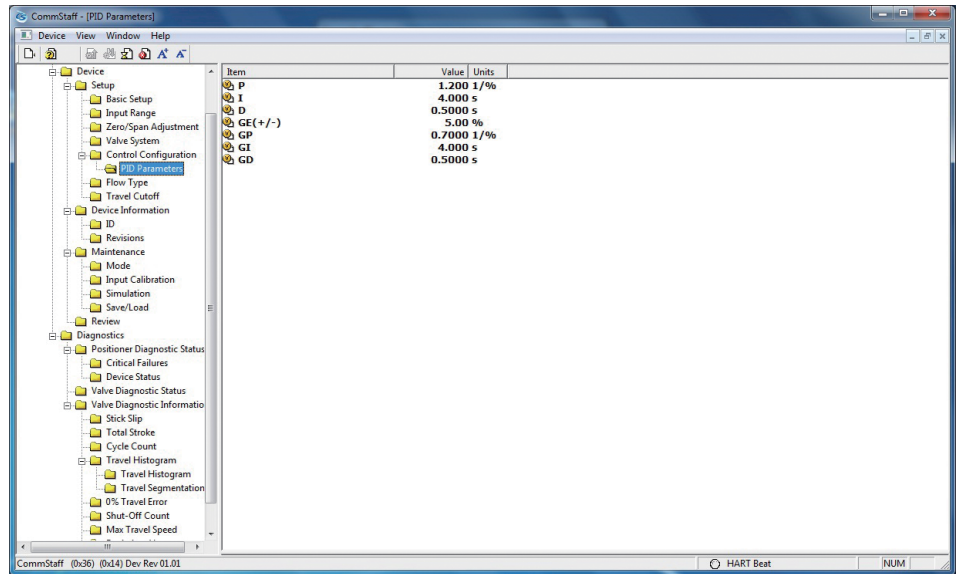
● HART version device type: SVP or SFN, with Param0

Click PID Parameters.
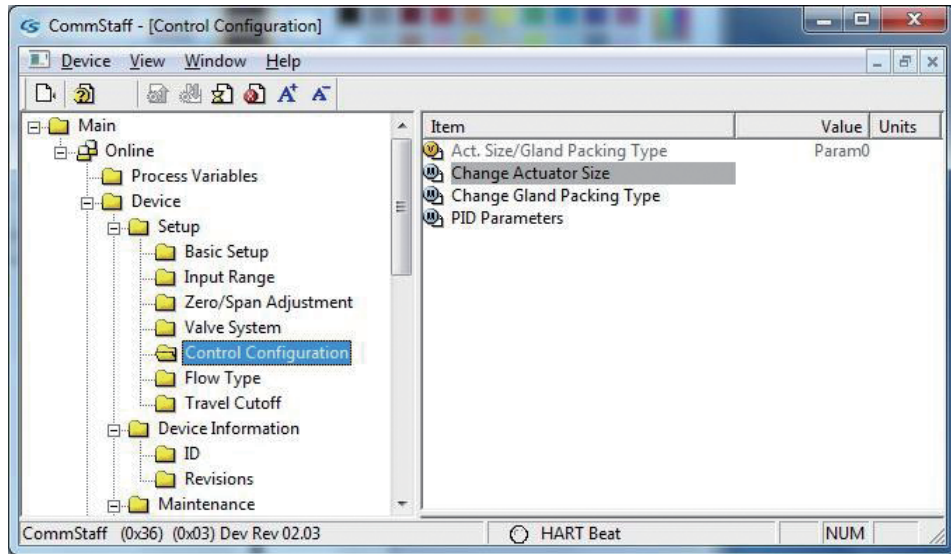
Click OK and set each of the PID parameters.
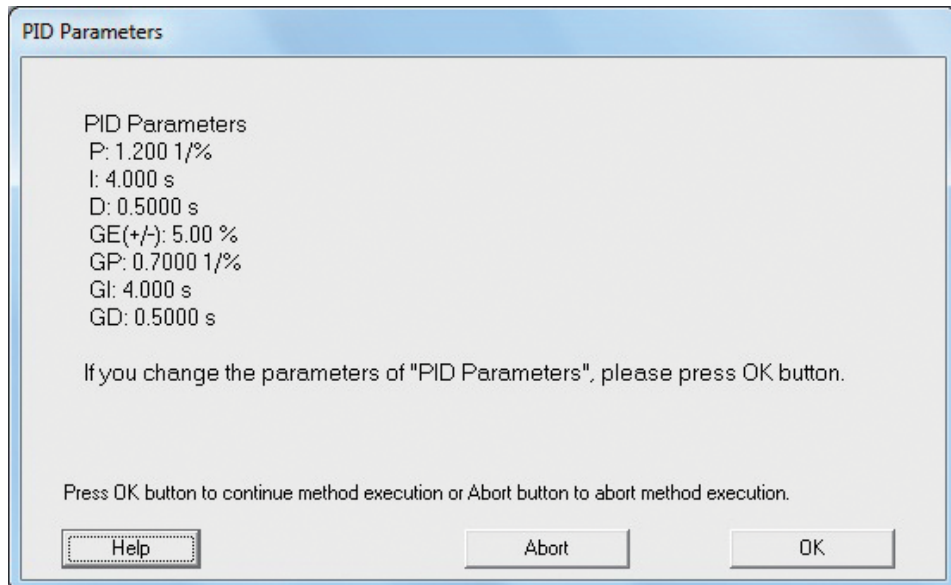
2-7.　Input Range

Select [Device] → [Setup] → [Input Range].
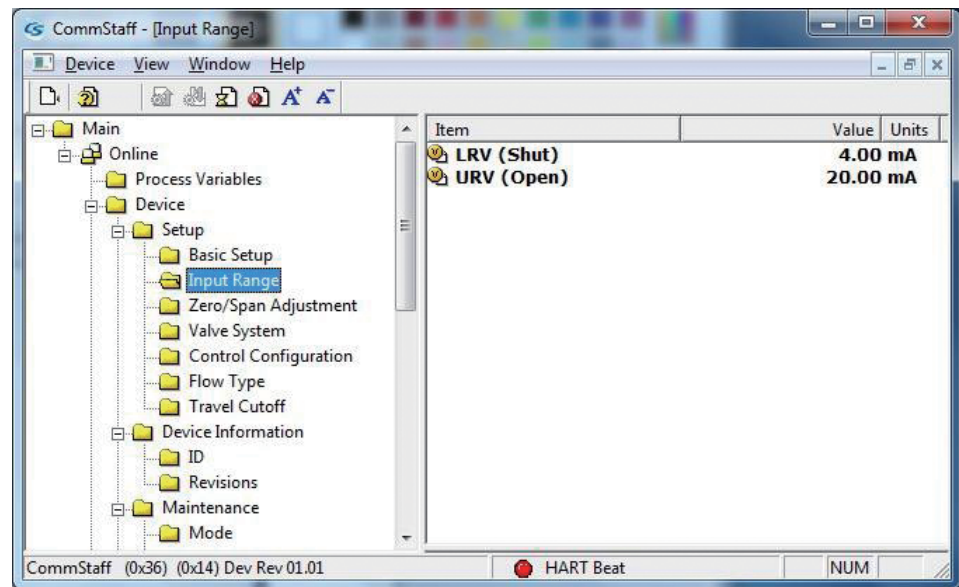
2-8.   Flow Type

Select [Device] → [Setup] → [Flow Type].
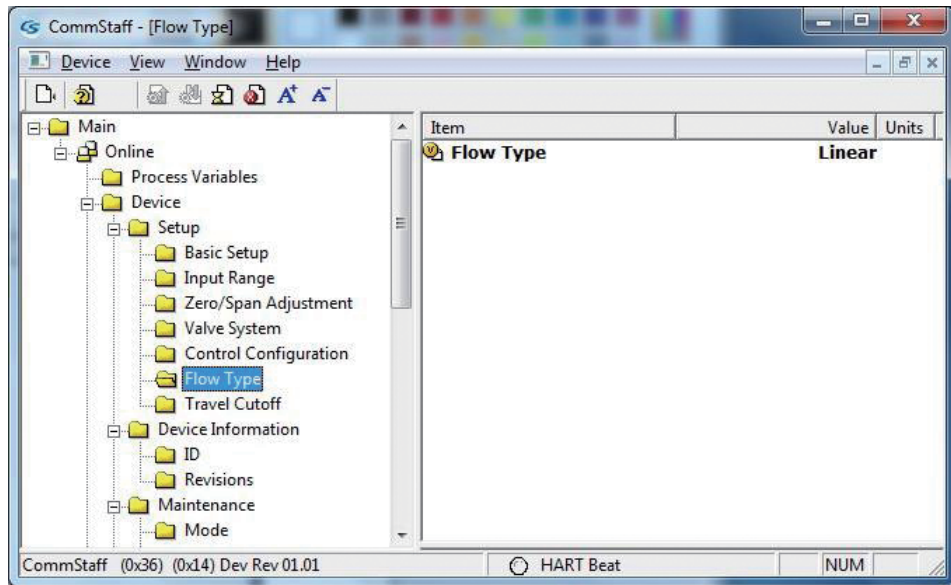
• If User-defined is selected, set User-defined Data separately.

2-9.　Travel Cutoff

Select [Device] → [Setup] → [Travel Cutoff].
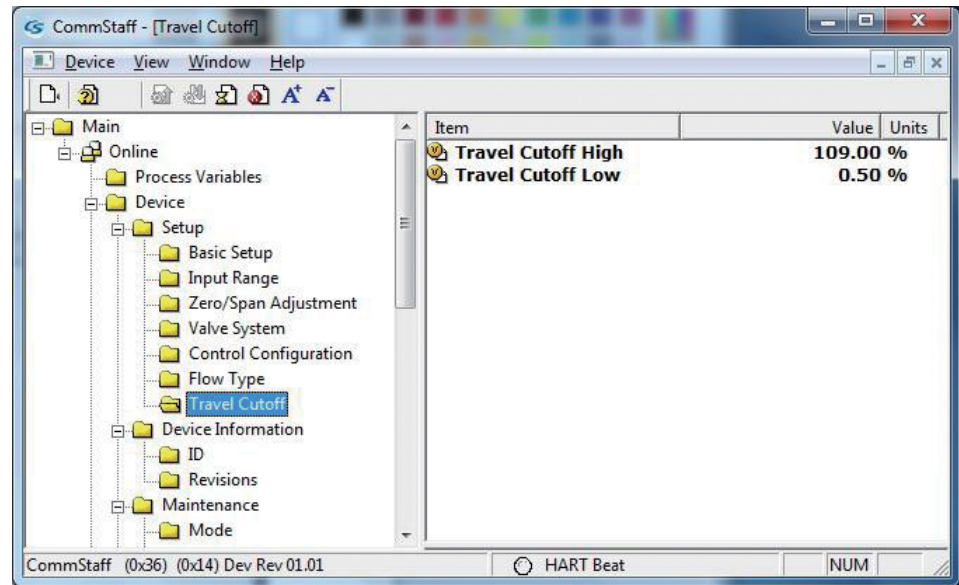
Chapter 3.   Maintenance

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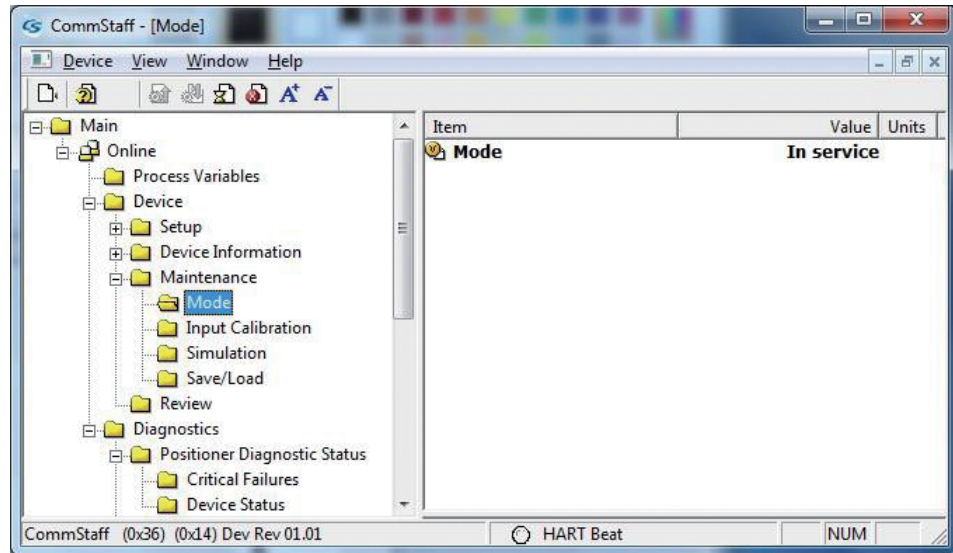
- When the Smart Positioner's power is turned on, it will go into In Service Mode.

3-2. Input Calibration

Calibrates the input signal (4 or 20 mA).

Select [Device] → [Maintenance] → [Input Calibration].
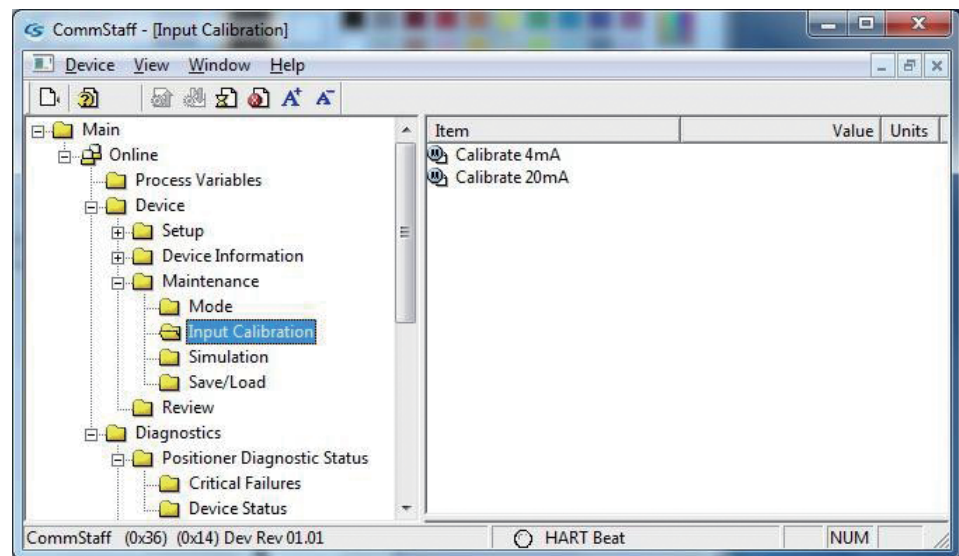
• Set the current input (controller output) to either 4 mA or 20 mA.
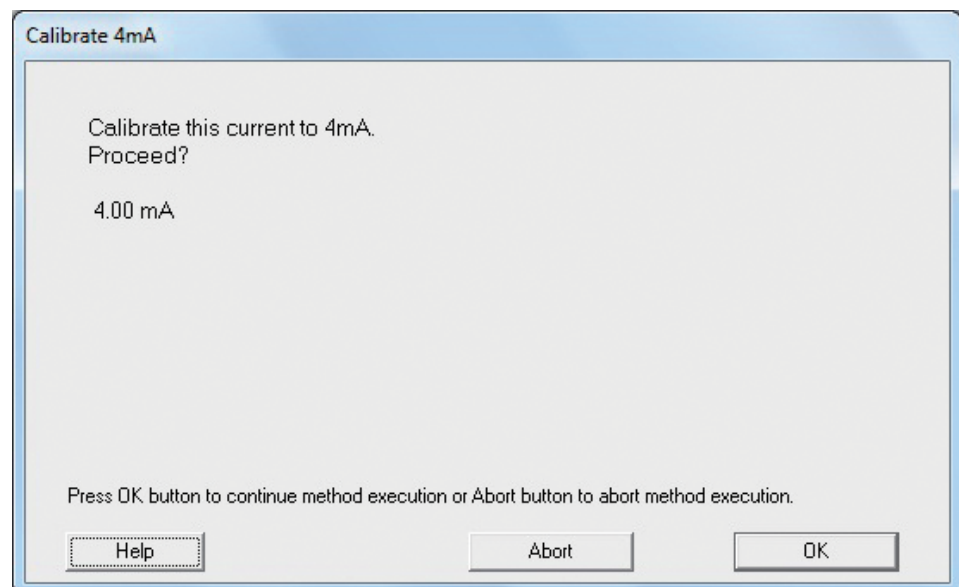
3-3.   Dummy Input Signal

Select [Device] → [Maintenance] → [Dummy Input Signal].
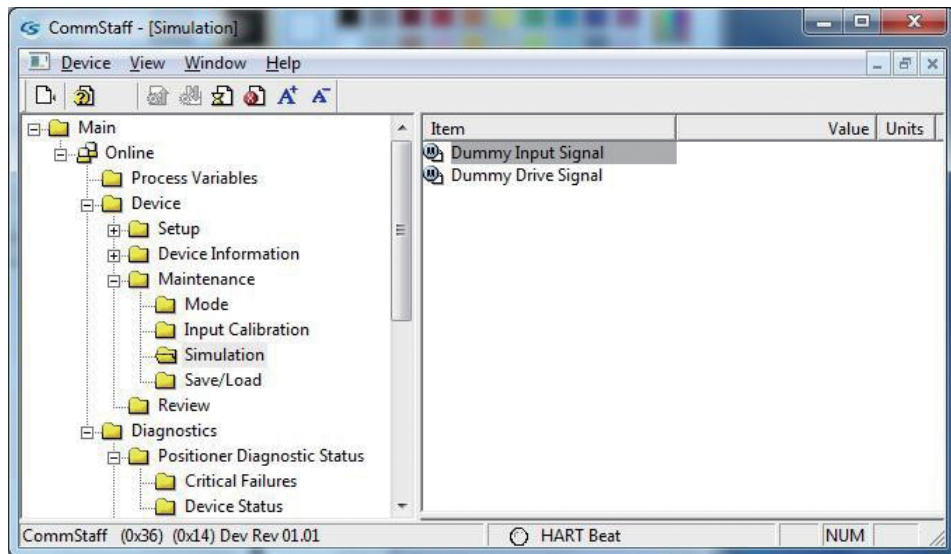
Make sure that the loop is set to manual, and configure the dummy input signal in the window shown below.
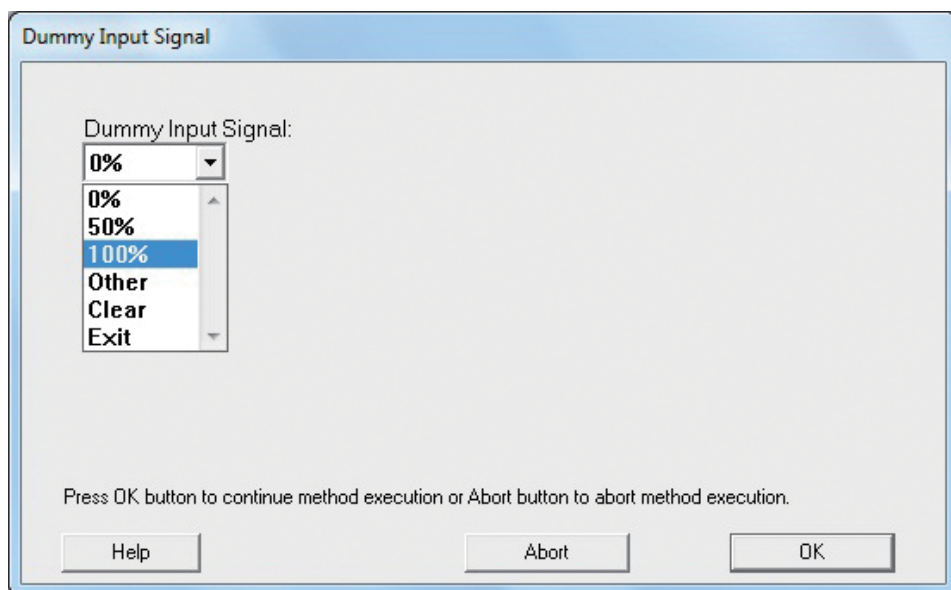
Selecting 0 % and clicking OK will keep the dummy input signal at 0 %.

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].
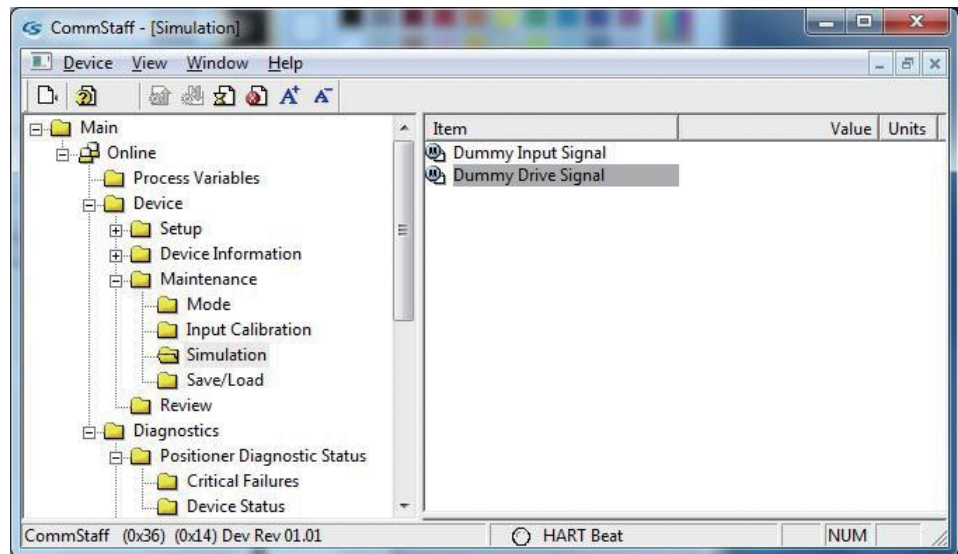
Make sure that the loop is set to manual and configure the dummy EPM drive signal in the window shown below.
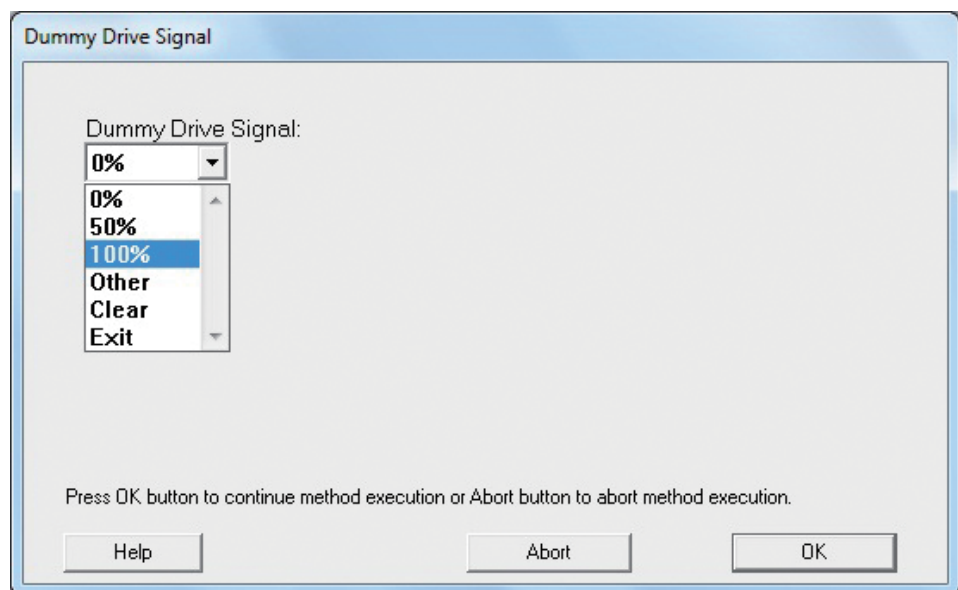
Selecting 0 % and clicking OK will keep the dummy EPM drive signal at 0 %.

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].
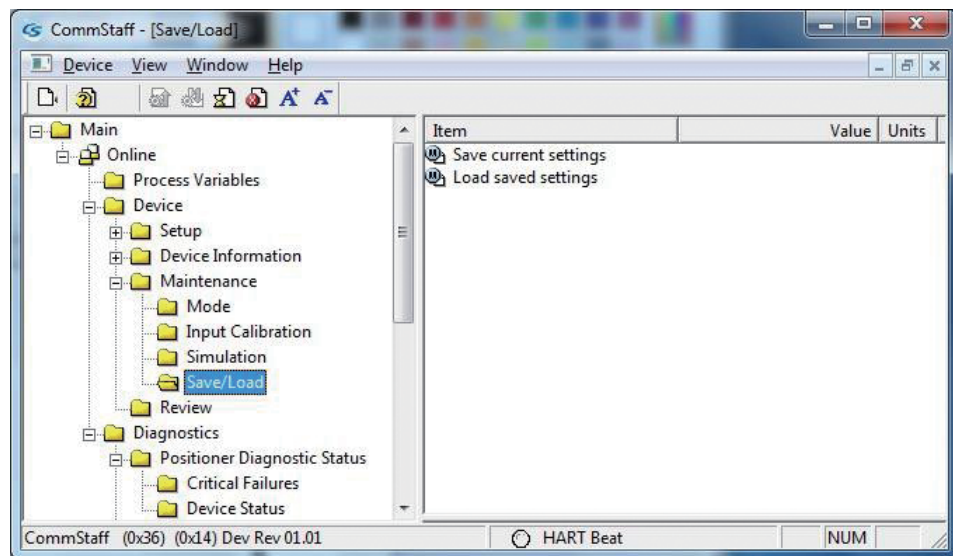
- When current settings are saved, the default settings will be changed.

- 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.
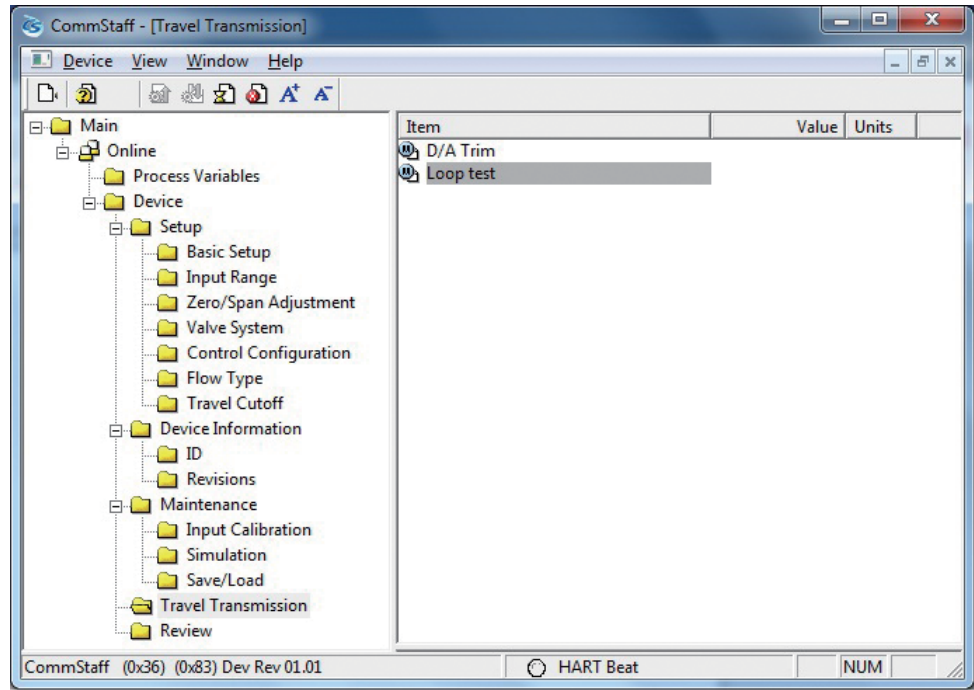
Make sure the loop is set to manual, and configure the dummy output signal in the following window.
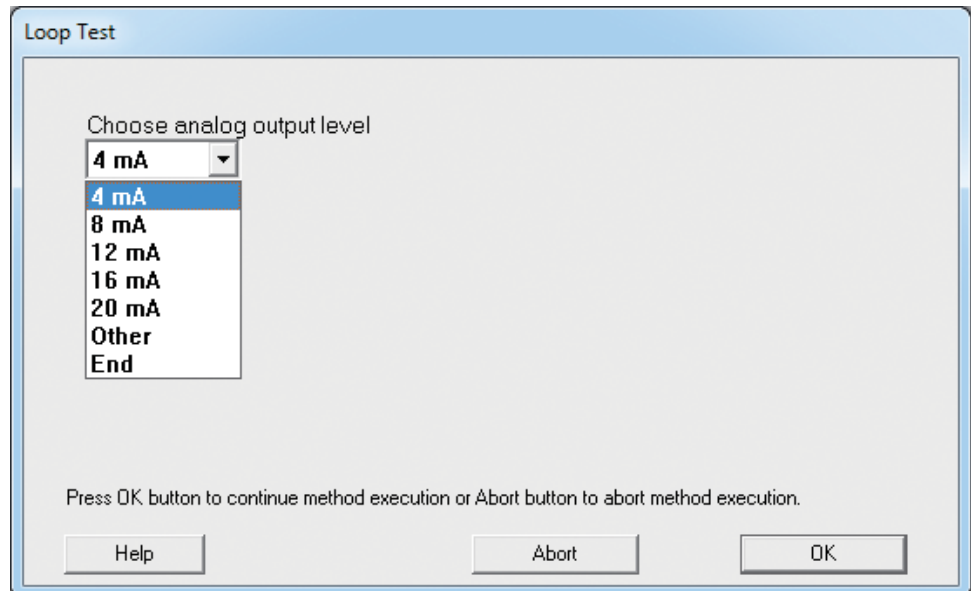
Select 4 mA and click OK. Output signals will be fixed at 4 mA (0%).

Select 8 mA and click OK. Output signals will be fixed at 8 mA (25%).

Select 12 mA and click OK. Output signals will be fixed at 12 mA (50%).

Select 16 mA and click OK. Output signals will be fixed at 16 mA (75%).

Select 20 mA and click OK. Output signals will be fixed 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 normal output mode will resume.

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.
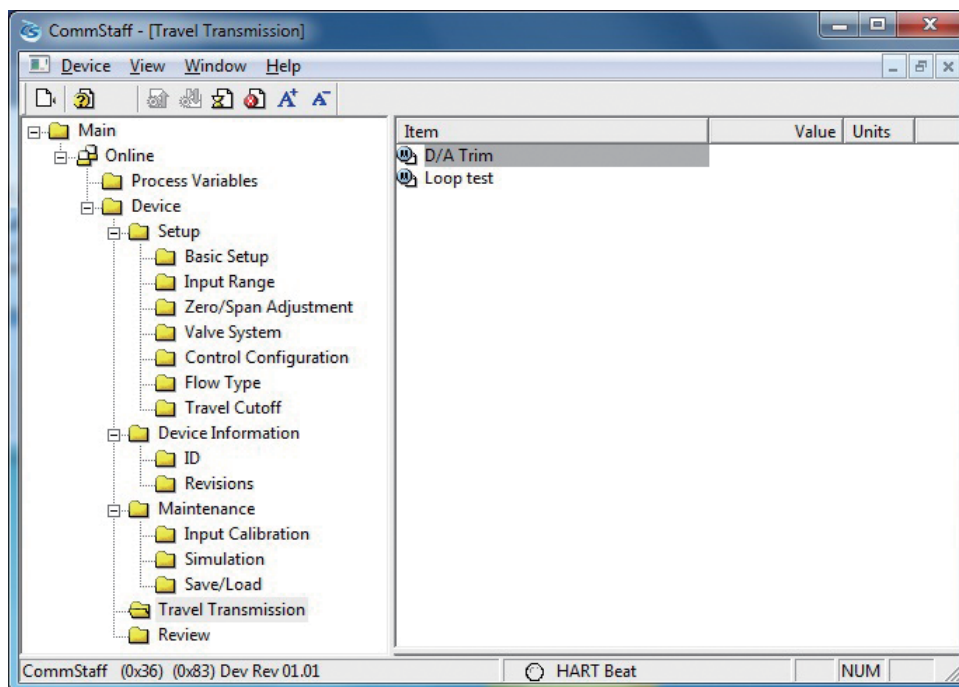
Connect the ammeter and calibrate the degree of opening transmission output for 4 and 20 mA.
Make sure that the loop is set to manual, and input the ammeter reading into the settings window shown below.
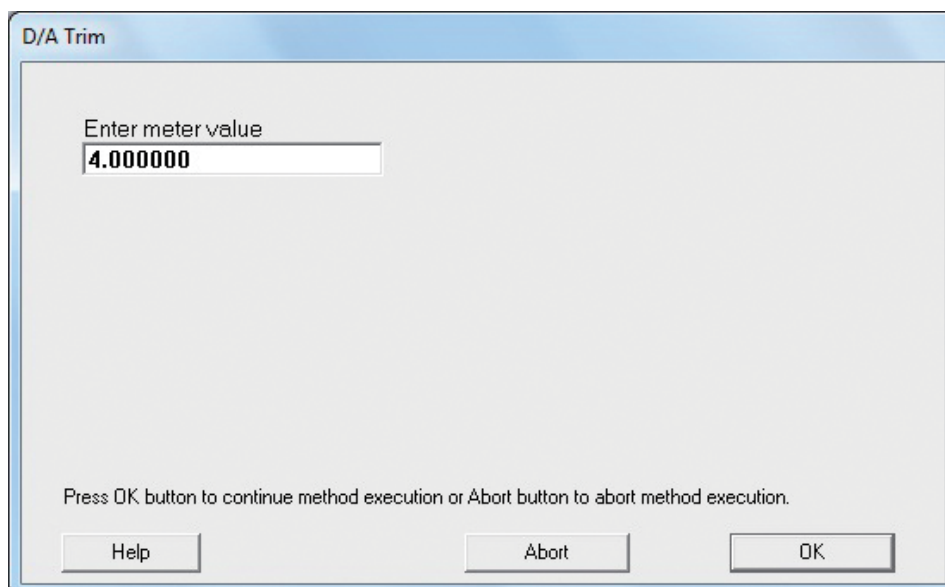
[Note]   For ordinary use it is not necessary to execute D/A trim, since it was calibrated before shipment. However, if the actual degree of opening and travel output differ, calibration should be done. In that case, use the following instruments:
・ Precision ammeter, min. accuracy 0.03 % FS
・ Precision resistor, 250 Ω ± 0.005 %

Chapter 4. Diagnostics

4-1. Self-diagnostic Messages for HART model

4-1-1. Critical Failures

Select [Diagnostics] → [Positioner Diagnostics Status] → [Critical Failures].
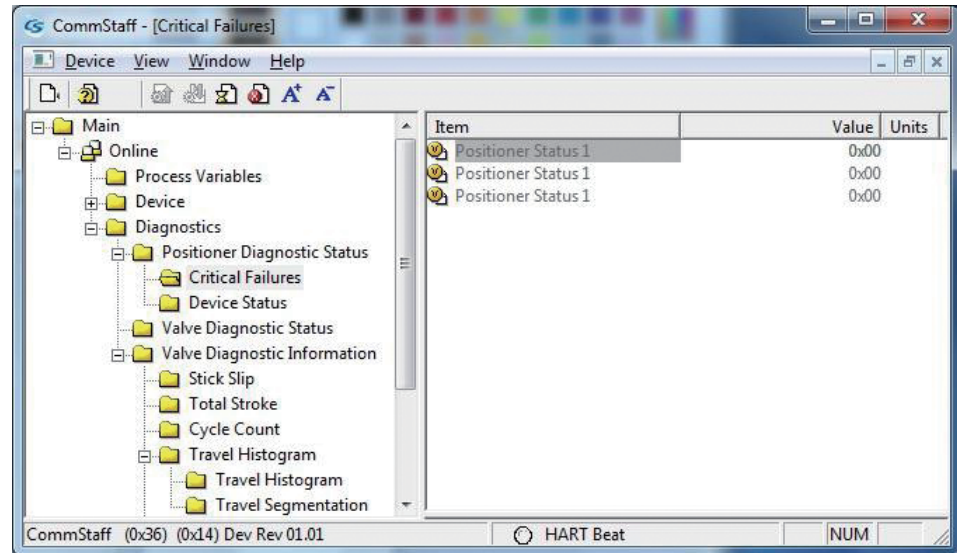
To check the details concerning a displayed item, right-click the item and select the value to display.

4-1-2. Device Status

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

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

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List of Self-Diagnostic Messages

Message	Meaning	Correction
Critical failure		
VTD FAULT	Valve position sensor problem.Feedback lever is detached or has turned beyond the allowable turning angle (±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.
Status		
OVER TEMP	The detected internal temperature of the device is below -45°C or above 85°C.	Change the operating conditions so that the temperature is within the specified range of -40 to 80°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: • No air is being supplied • Valve is closed • Galling of valve stem • Clogged nozzle • Clogged orifice	• Check air supply pressure • Confirm A/M switch is Auto • Clean air nozzle • Clean orifice • Adjust the EPM balance
TRAVEL CUT OFF	SVP is forced fully opened or closed.	• Apply an input signal above the forced fully shut valve or below the forced fully open valve. • Use the SFC to check and/or adjust the forced fully open/close values (%).

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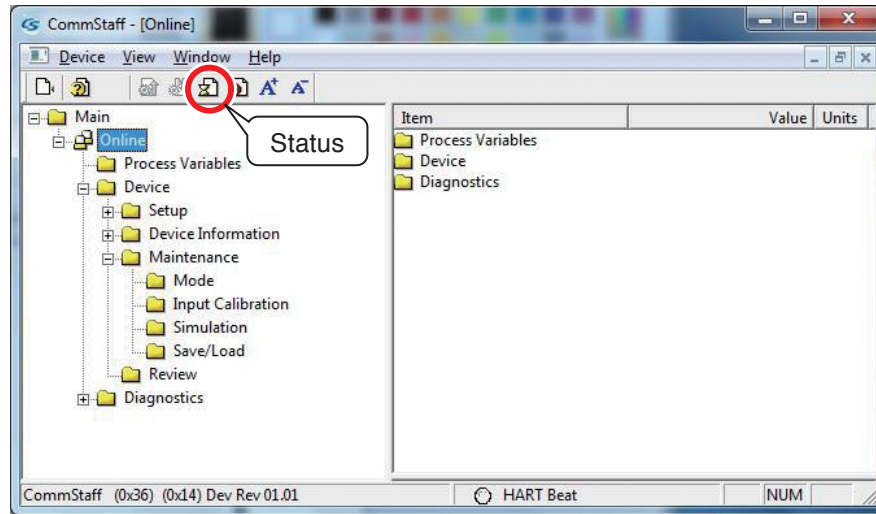
For example, if the dummy input signal has been set up, the MANUAL MODE button will be lit red. (It takes some time for the status group items to be displayed.)
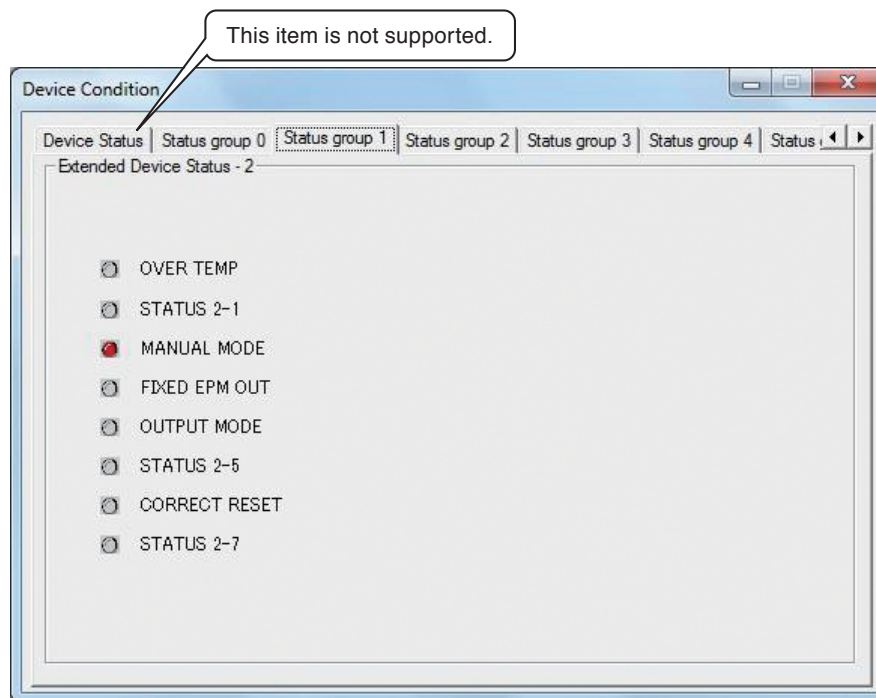

[Note]   Items shown in "STATUS X-Y" format (STATUS 2-1, etc.) are unknown errors.

List of Self-Diagnostic Messages

Message	Meaning	Correction
Critical failure		
VTD FAULT	Valve position sensor problem. Feedback lever is detached or has turned beyond the allowable turning angle (±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.
Device status		
OVER TEMP	The detected internal temperature of the device is below -45°C or above 85°C.	Change the operating conditions so that the temperature is within the specified range of -40 to 80°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: • No air is being supplied • Valve is closed • Galling of valve stem • Clogged nozzle • Clogged orifice	• Check air supply pressure • Confirm A/M switch is Auto • Clean air nozzle • Clean orifice • Adjust the EPM balance
SHUT ON	SVP is forced fully opened or closed.	• Apply an input signal above the forced fully shut valve or below the forced fully open valve. • Use the SFC to check and/or adjust the forced fully open/close values (%).

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

Select [Diagnostics] → [Valve Diagnostics Status].
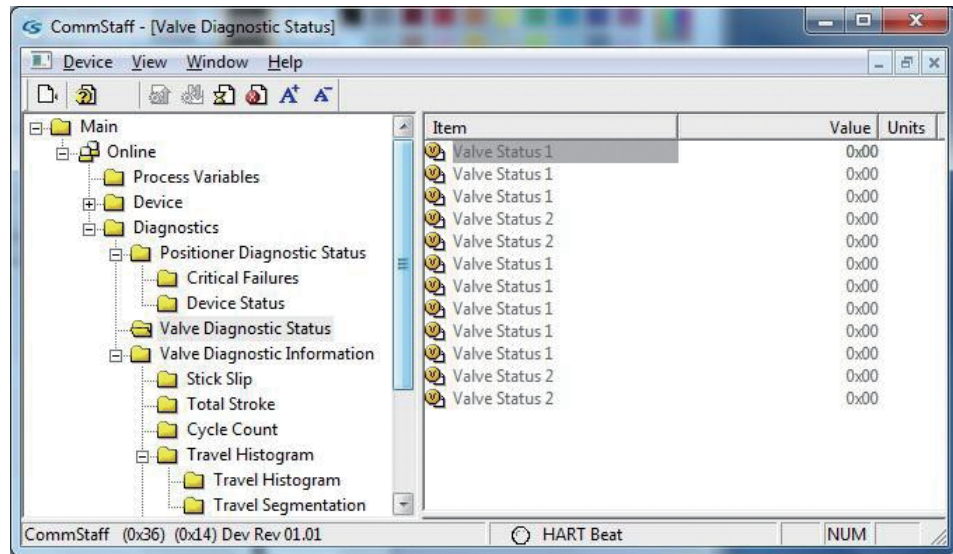
To check the details concerning a displayed item, right-click the item and select the value to display.

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)

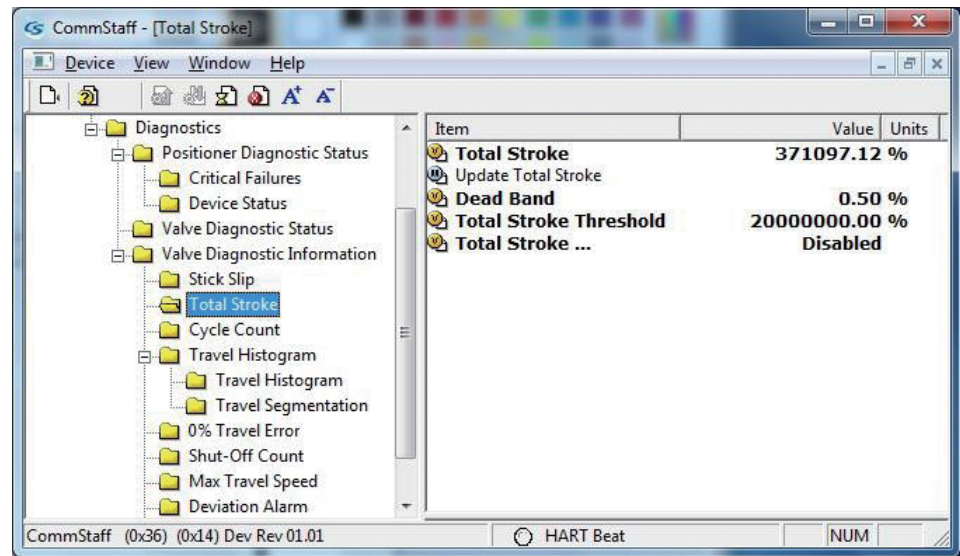Select [Diagnostics] → [Valve Diagnostics Information].
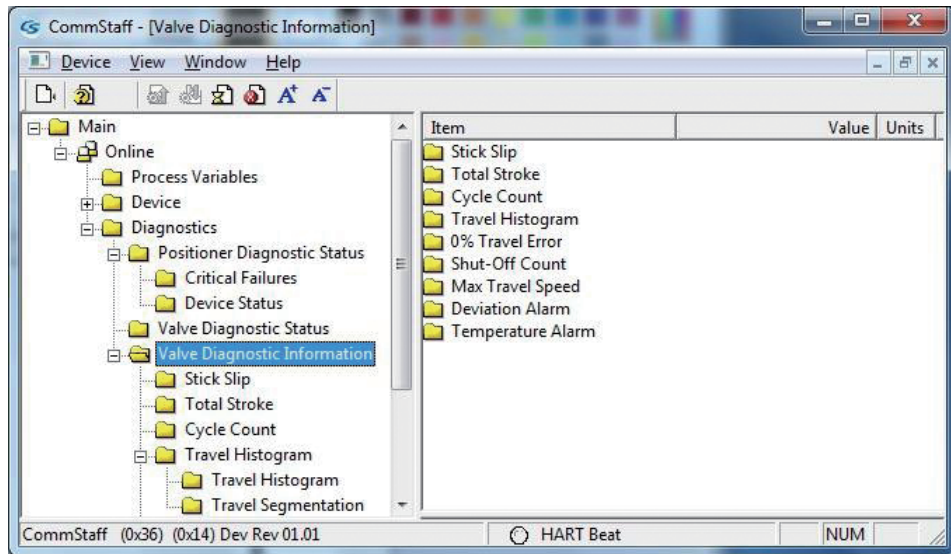
4-4-1. Stick Slip

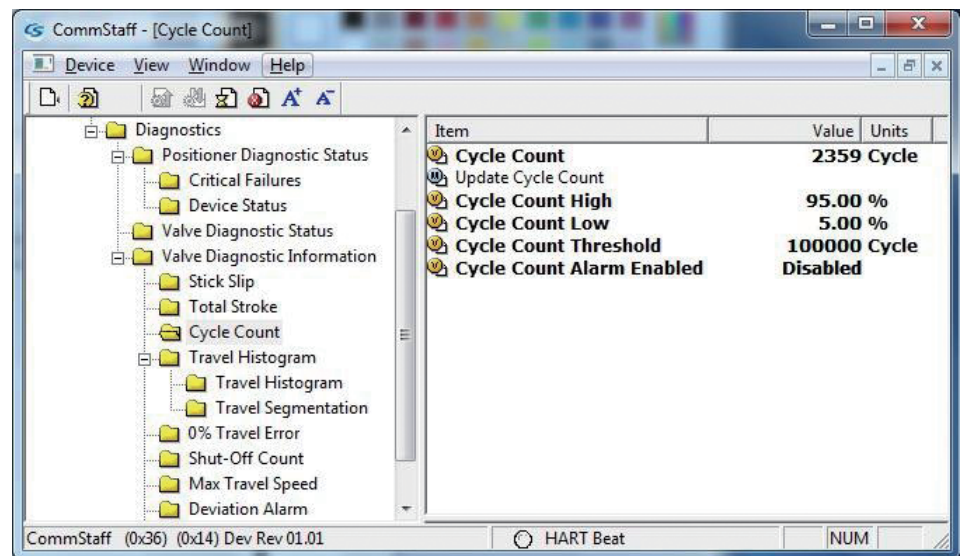Select [Diagnostics] → [Valve Diagnostics Information] → [Stick Slip].
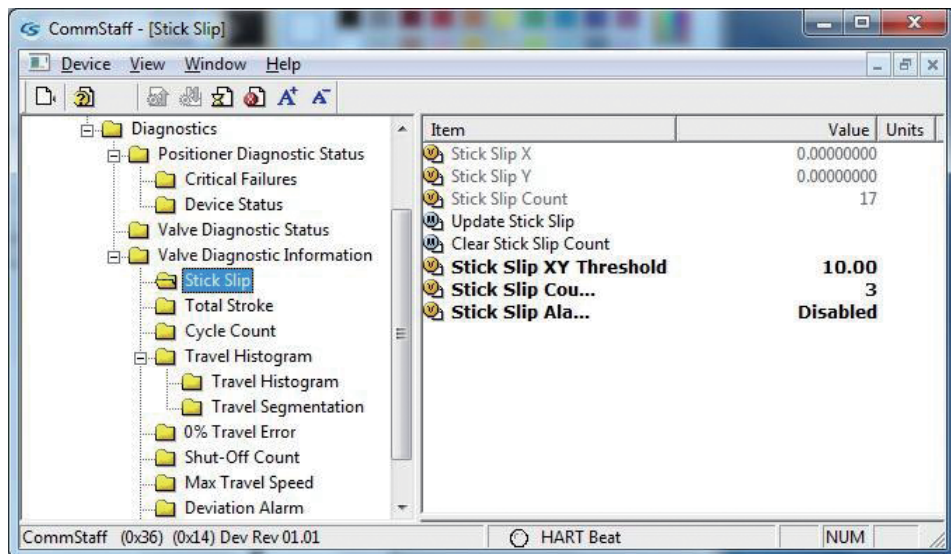
4-4-2. Total Stroke

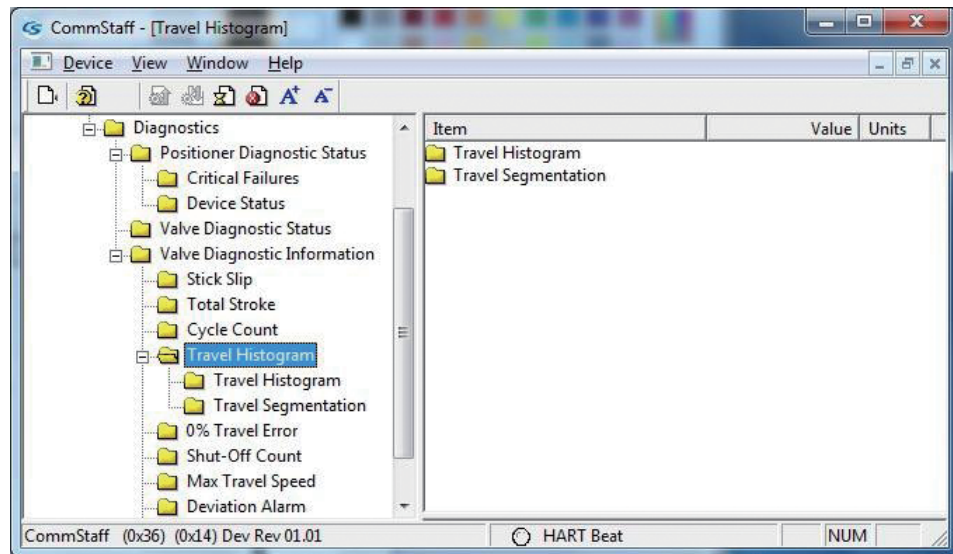Select [Diagnostics] → [Valve Diagnostics Information] → [Total Stroke].

4-4-3. Cycle Count

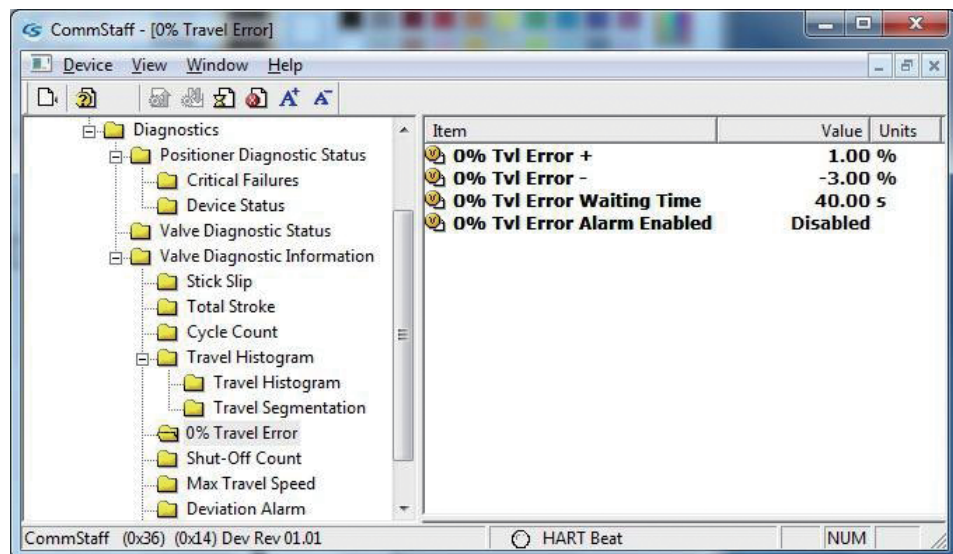Select [Diagnostics] → [Valve Diagnostics Information] → [Cycle Count].

4-4-4. Travel Histogram

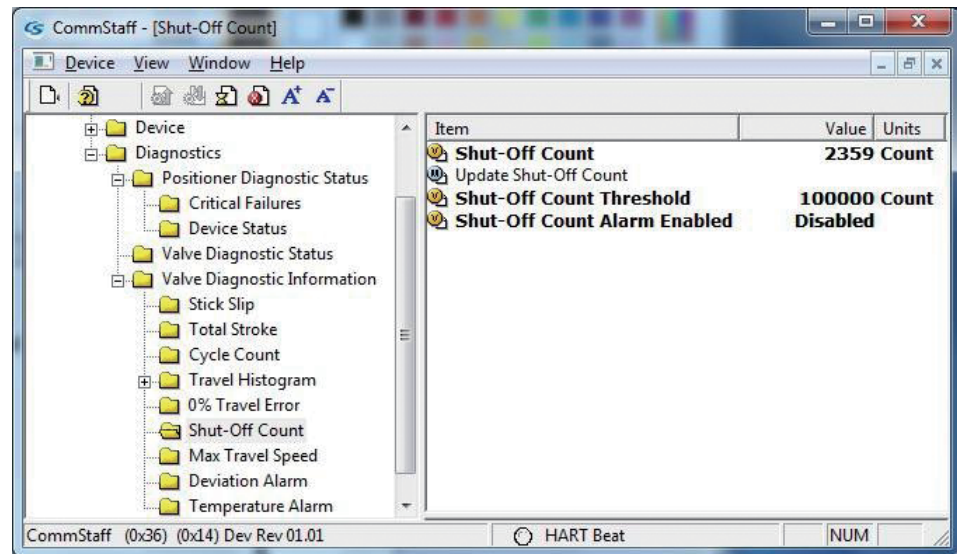Select [Diagnostics] → [Valve Diagnostics Information] → [Travel Histogram].

4-4-5. 0% Travel Error

Select [Diagnostics] → [Valve Diagnostics Information] → [0% Travel Error].
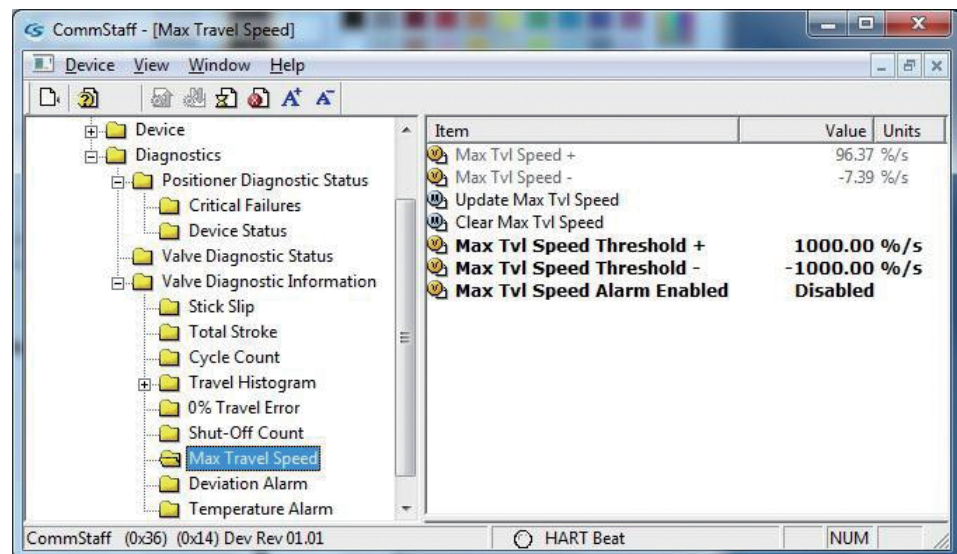
4-4-6. Shut-Off Count

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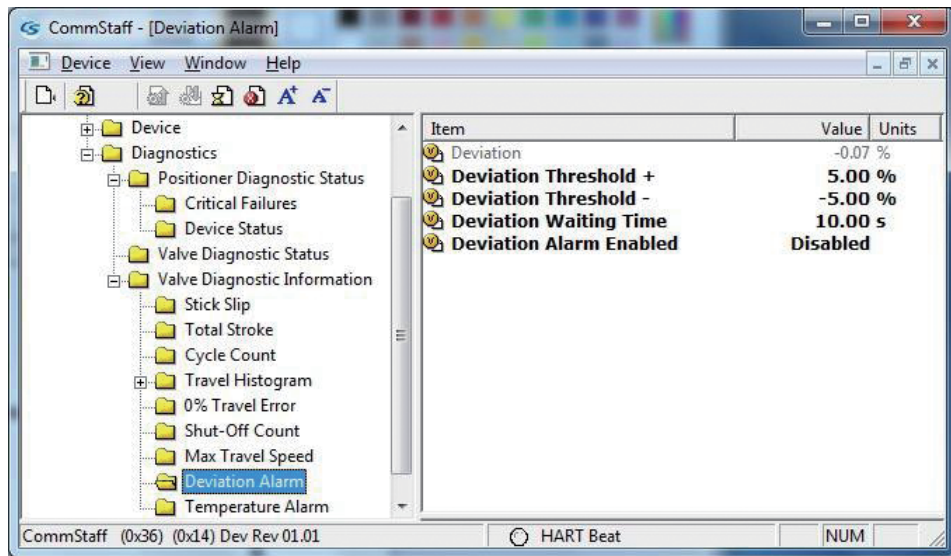

4-4-7. Max Travel Speed

Select [Diagnostics] → [Valve Diagnostics Information] → [Max Travel Speed].
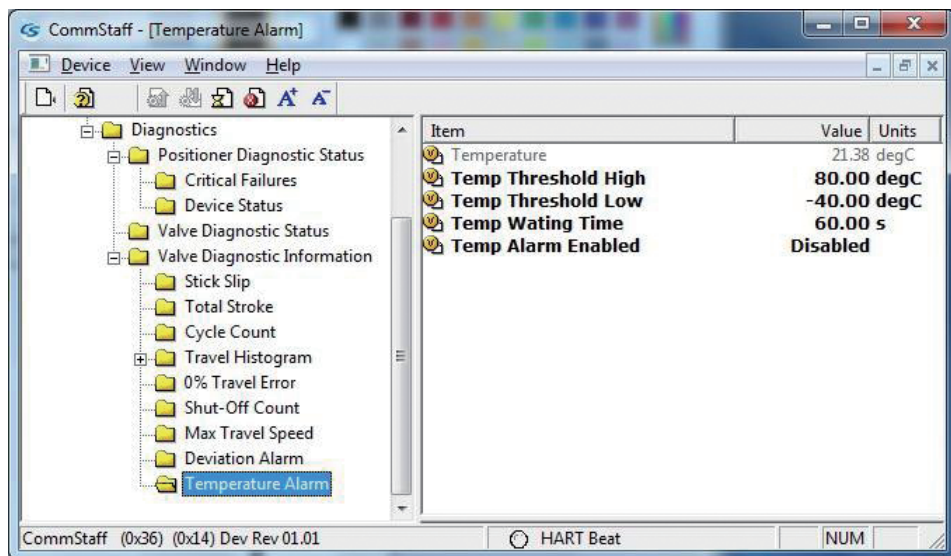
4-4-8. Deviation Alarm

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

4-4-9. Temp Alarm

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

Terms and Conditions

We would like to express our appreciation for your purchase and use of Azbil Corporation's products. You are required to acknowledge and agree upon the following terms and conditions for your purchase of Azbil Corporation's products (system products, field instruments, control valves, and control products), unless otherwise stated in any separate document, including, without limitation, estimation sheets, written agreements, catalogs, specifications and instruction manuals.

1. **Warranty period and warranty scope**
    1.1 **Warranty period**
    Azbil Corporation's products shall be warranted for one (1) year from the date of your purchase of the said products or the delivery of the said products to a place designated by you.
    1.2 **Warranty scope**
    In the event that Azbil Corporation's product has any failure attributable to azbil during the aforementioned warranty period, Azbil Corporation shall, without charge, deliver a replacement for the said product to the place where you purchased, or repair the said product and deliver it to the aforementioned place. Notwithstanding the foregoing, any failure falling under one of the following shall not be covered under this warranty:
    (1) Failure caused by your improper use of azbil product (noncompliance with conditions, environment of use, precautions, etc. set forth in catalogs, specifications, instruction manuals, etc.);
    (2) Failure caused for other reasons than Azbil Corporation's product;
    (3) Failure caused by any modification or repair made by any person other than Azbil Corporation or Azbil Corporation's subcontractors;
    (4) Failure caused by your use of Azbil Corporation's product in a manner not conforming to the intended usage of that product;
    (5) Failure that the state-of-the-art at the time of Azbil Corporation's shipment did not allow Azbil Corporation to predict; or
    (6) Failure that arose from any reason not attributable to Azbil Corporation, including, without limitation, acts of God, disasters, and actions taken by a third party.
    Please note that the term "warranty" as used herein refers to equipment-only-warranty, and Azbil Corporation shall not be liable for any damages, including direct, indirect, special, incidental or consequential damages in connection with or arising out of Azbil Corporation's products.

2. **Ascertainment of suitability**
    You are required to ascertain the suitability of Azbil Corporation's product in case of your use of the same with your machinery, equipment, etc. (hereinafter referred to as "Equipment") on your own responsibility, taking the following matters into consideration:
    (1) Regulations and standards or laws that your Equipment is to comply with.
    (2) Examples of application described in any documents provided by Azbil Corporation are for your reference purpose only, and you are required to check the functions and safety of your Equipment prior to your use.
    (3) Measures to be taken to secure the required level of the reliability and safety of your Equipment in your use Although azbil is constantly making efforts to improve the quality and reliability of Azbil Corporation's products, there exists a possibility that parts and machinery may break down.
    You are required to provide your Equipment with safety design such as fool-proof design, [*1] and fail-safe design[*2] (anti-flame propagation design, etc.), whereby preventing any occurrence of physical injuries, fires, significant damage, and so forth. Furthermore, fault avoidance, [*3] fault tolerance,[*4] or the like should be incorporated so that the said Equipment can satisfy the level of reliability and safety required for your use.

    *1. A design that is safe even if the user makes an error.
    *2. A design that is safe even if the device fails.
    *3. Avoidance of device failure by using highly reliable components, etc.
    *4. The use of redundancy.

3. **Precautions and restrictions on application**
    Azbil Corporation's products other than those explicitly specified as applicable (e.g. azbil Limit Switch For Nuclear Energy) shall not be used in a nuclear energy controlled area (radiation controlled area).
    Any Azbil Corporation's products shall not be used for/with medical equipment.
    The products are for industrial use. Do not allow general consumers to install or use any Azbil Corporation's product. However, azbil products can be incorporated into products used by general consumers. If you intend to use a product for that purpose, please contact one of our sales representatives.
    In addition,
    you are required to conduct a consultation with our sales representative and understand detail specifications, cautions for operation, and so forth by reference to catalogs, specifications, instruction manual, etc. in case that you intend to use azbil product for any purposes specified in (1) through (6) below.
    Moreover, you are required to provide your Equipment with fool-proof design, fail-safe design, anti-flame propagation design, fault avoidance, fault tolerance, and other kinds of protection/safety circuit design on your own responsibility to ensure reliability and safety, whereby preventing problems caused by failure or nonconformity.
    (1) For use under such conditions or in such environments as not stated in technical documents, including catalogs, specification, and instruction manuals

    (2) For use of specific purposes, such as:
- * Nuclear energy/radiation related facilities
  [For use outside nuclear energy controlled areas] [For use of Azbil Corporation's Limit Switch For Nuclear Energy]
- * Machinery or equipment for space/sea bottom
- * Transportation equipment
  [Railway, aircraft, vessels, vehicle equipment, etc.]
- * Antidisaster/crime-prevention equipment
- * Burning appliances
- * Electrothermal equipment
- * Amusement facilities
- * Facilities/applications associated directly with billing

    (3) Supply systems such as electricity/gas/water supply systems, large-scale communication systems, and traffic/air traffic control systems requiring high reliability

    (4) Facilities that are to comply with regulations of governmental/public agencies or specific industries

    (5) Machinery or equipment that may affect human lives, human bodies or properties

    (6) Other machinery or equipment equivalent to those set forth in items (1) to (5) above which require high reliability and safety

4. Precautions against long-term use

Use of Azbil Corporation's products, including switches, which contain electronic components, over a prolonged period may degrade insulation or increase contact-resistance and may result in heat generation or any other similar problem causing such product or switch to develop safety hazards such as smoking, ignition, and electrification.

Although acceleration of the above situation varies depending on the conditions or environment of use of the products, you are required not to use any Azbil Corporation's products for a period exceeding ten (10) years unless otherwise stated in specifications or instruction manuals.

5. Recommendation for renewal

Mechanical components, such as relays and switches, used for Azbil Corporation's products will reach the end of their life due to wear by repetitious open/close operations.

In addition, electronic components such as electrolytic capacitors will reach the end of their life due to aged deterioration based on the conditions or environment in which such electronic components are used.

Although acceleration of the above situation varies depending on the conditions or environment of use, the number of open/close operations of relays, etc.

as prescribed in specifications or instruction manuals, or depending on the design margin of your machine or equipment, you are required to renew any Azbil Corporation's products every 5 to 10 years unless otherwise specified in specifications or instruction manuals.

System products, field instruments (sensors such as pressure/flow/level sensors, regulating valves, etc.) will reach the end of their life due to aged deterioration of parts.

For those parts that will reach the end of their life due to aged deterioration, recommended replacement cycles are prescribed. You are required to replace parts based on such recommended replacement cycles.

6. Other precautions

Prior to your use of Azbil Corporation's products, you are required to understand and comply with specifications (e.g., conditions and environment of use), precautions, warnings/cautions/notices as set forth in the technical documents prepared for individual Azbil Corporation's products, such as catalogs, specifications, and instruction manuals to ensure the quality, reliability, and safety of those products.

7. Changes to specifications

Please note that the descriptions contained in any documents provided by azbil are subject to change without notice for improvement or for any other reason.

For inquires or information on specifications as you may need to check, please contact our branch offices or sales offices, or your local sales agents.

8. Discontinuance of the supply of products/parts

Please note that the production of any Azbil Corporation's product may be discontinued without notice.

For repairable products, we will, in principle, undertake repairs for five (5) years after the discontinuance of those products. In some cases, however, we cannot undertake such repairs for reasons, such as the absence of repair parts.

For system products, field instruments, we may not be able to undertake parts replacement for similar reasons.

9. Scope of services

Prices of Azbil Corporation's products do not include any charges for services such as engineer dispatch service. Accordingly, a separate fee will be charged in any of the following cases:

    (1) Installation, adjustment, guidance, and attendance at a test run

    (2) Maintenance, inspection, adjustment, and repair

    (3) Technical guidance and technical education

    (4) Special test or special inspection of a product under the conditions specified by you

Please note that we cannot provide any services as set forth above in a nuclear energy controlled area (radiation controlled area) or at a place where the level of exposure to radiation is equivalent to that in a nuclear energy controlled area.

AAS-511A-014-09

Azbil Corporation