

## VariStroke Actuator Undetectable Feedback High Limit Failure

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### *Issue*

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VariStroke actuators shipped before March 1, 2022 may not detect if one or both of its dual-redundant output shaft position sensors have failed. This may result in the VariStroke actuator operating in the wrong position or ramping its output shaft and connected steam valve to its full-open or full-closed position.

### *Description*

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VariStroke actuators utilize 4-20mA dual-redundant output shaft position sensors, which have been found to only output 21.5mA when they fail in their high output state. However, the servo module in VariStroke actuators shipped before March 1, 2022 only detects that a position sensor has failed in the high output state if the sensed current level is 22mA or higher. Depending on the position of the VariStroke actuator's output shaft during this failed condition, the VariStroke actuator may operate in the wrong position or ramp its output shaft and connected steam valve to the full-open or full-closed positions. Note that all turbines utilizing Woodward products, including VariStroke actuators, are required to utilize overspeed detection systems for safety reasons.

### *Affected Units*

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- **VariStroke-I actuators (double-acting models)**: All units shipped prior to March 1, 2022 and utilizing firmware 5418-6606 or 5418-7525.
- **VariStroke-GI actuators (single-acting models)**: All units shipped prior to January 2022 and utilizing firmware 5418-7897.
- **VariStroke-DX actuators (dual-redundant servo models)**: All units shipped prior to January 2022 and utilizing firmware 5418-7897.
- **All VariStroke-I actuators utilizing a 3rd party position sensor**, other than the Woodward-supplied position sensor, should evaluate the potential impact to their system. Verify the current value of the position sensor failure mode against the VariStroke-I settings as noted in this bulletin.

Refer to the Corrective Action section below for procedures on how to determine the shipment date and firmware of your VariStroke actuator.

### *Corrective Action*

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#### **VariStroke-I model actuators shipped prior to March 1, 2022 with firmware 5418-6606:**

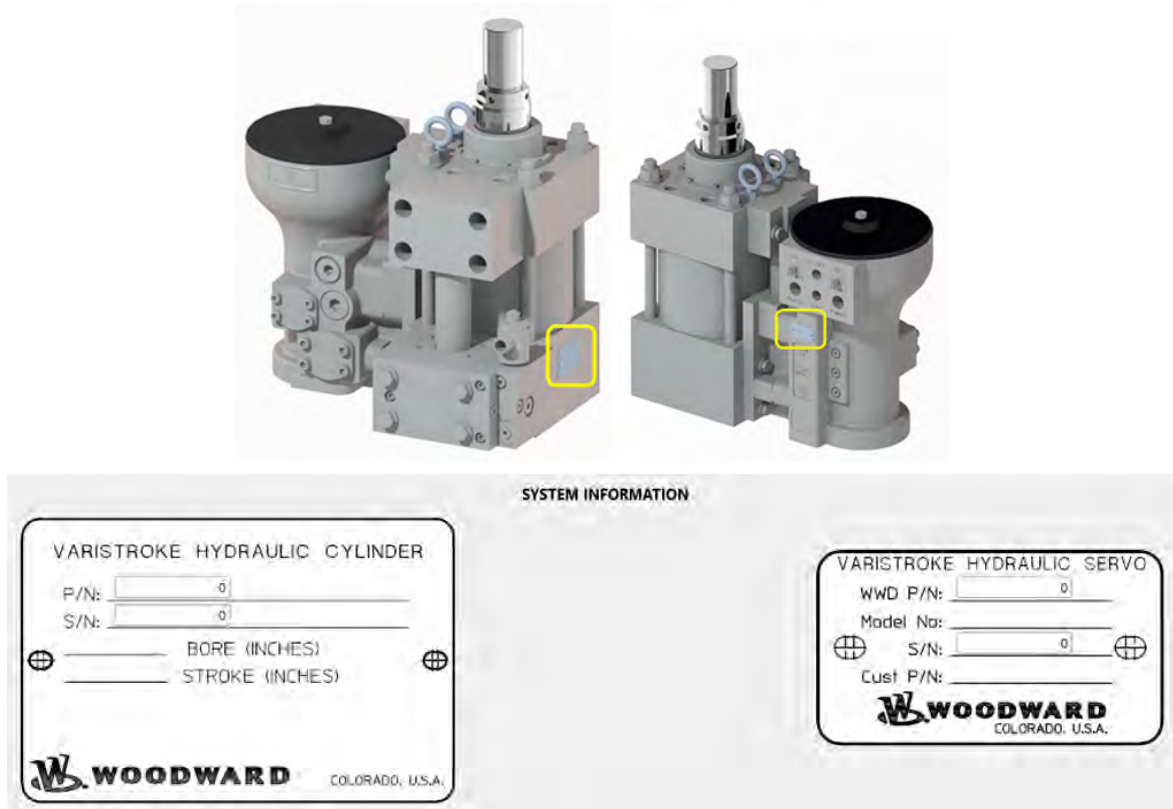
If this issue is a concern, it is recommended that the actuator be sent to Woodward or a local Woodward Authorized Service Facility for the servo module's firmware program to be updated and feedback fault detection thresholds to be adjusted. If this issue is not a concern, no action is required. Alternatively, a Woodward or Authorized Channel Partner's field service engineer may be contracted to perform this firmware program update in the field at a customer's site.

#### **All other VariStroke actuators shipped prior to March 1, 2022:**

If this issue is a concern, it is recommended that a capable plant technician/engineer use the VariStroke Customer Service Tool installed on a computer and connected to the VariStroke servo, to adjust both of the VariStroke's Position Feedback Sensors "1 and 2" Fault Detection Threshold High Limit settings to 21mA. If this issue is not a concern, no action is required. Alternatively, a Woodward or Authorized Channel Partner's field service engineer may be contracted to perform this configuration change in the field at a customer's site. Follow the procedures below to verify the VariStroke shipment date and firmware revision level. Depending on shipment date and firmware, adjust the VariStroke's Fault Detection settings.

**VariStroke Shipment Date Verification Procedure:**

1. On a computer connected to the internet, go to [www.woodward.com/software](http://www.woodward.com/software).
1. From the website, go to the Support / Industrial / Service & Spare Parts page.
2. Scroll down to the "PRODUCT HISTORY LOOKUP" section and select the "Learn More" button.
3. Enter the respective VariStroke actuator's part number and serial number (located on the VariStroke's side label) and select the search button. See figures below for the correct location of part number and serial number:



4. Within the provided "Asset Service Management Information", verify the "Original Shipment Date" of your actuator. If the shipment date was on or before March 1, 2022, then proceed to the next procedure to verify which firmware program your VariStroke is using. If the shipment date was after March 1, 2022, then your actuator is not one of the affected units and no corrective action is required.

Refer to the following screen captures as examples:

Product History Lookup | Woodward

woodward.com/en/support/industrial/service-and-spare-parts/product-history-lookup

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WOODWARD PRODUCTS APPLICATIONS INDUSTRY SUPPORT MARKS OF PROGRESS LOGIN

Home / Industrial / Service & Spare Parts / Product History Lookup

## Product History Lookup

Woodward designs and manufactures components that provide industry leading performance and reliability for the gas, steam and compressor markets around the world. Proper maintenance practices have been developed to properly ensure the performance, reliability, availability, and on-going "safety of operation" at your site. Effective management of revisions and upgrades will also provide you increased reliability, availability, and performance to maximize your productivity.

Locate the Woodward product label for the serial number and part number (Woodward or OEM PN), then lookup the key information you need to maintain, service or upgrade on your Woodward product.

Part Number \* Serial Number \*

\* Required for inquiry.

ebus.woodward.com/iframe/software/ValveStatus/sitecoreSearchResults.cfm?id=CB407f4431B3CF0833f5318f8633fA7AA2206C080f67D4f3C5A362CDE306113FFE2C1C57DAFDA71981BD1f64f31868D6A0575303C5D

WOODWARD

**Input Information of Search:**

Serial Number	Part Number	Description	Inquiry Date
20699731	9907-1338	ACTUATOR	2/24/2022, 4:23:05 PM

**Recommended Preventative Maintenance:**

Preventative Maintenance (PM) Kit Part Number
N/A

Woodward recommends the application of preventative maintenance (PM) kits between scheduled overhaul periods. The service kits normally can be applied on products while they are still integrated on your machine without having to remove them. Normal application of PM kits are recommended intermediate scheduled downtimes between overhauls at major intervals. PM kits are available on-line at [www.woodward.com](http://www.woodward.com) or through your sites Turbine OEM service representative or local Woodward distributor.

**Asset Service Management Information:**

Original Shipment Date	Last PN Shipped As	Last Service Date	Status	Upgrade/Replacement PN
23-NOV-2016	9907-1338	14-JUN-2021	ACTIVE	N/A

VariStroke Firmware Verification Procedure:

1. Follow this procedure only if your actuator's shipment date was before March 1, 2022.
2. Follow instructions in manual 35148 *Customer Service Tool for VariStroke Actuators* to download the latest Customer Service Tool (9927-2177 Rev L) from Woodward.com, install it on a computer, and connect the computer to your VariStroke actuator(s).
3. Once the Customer Service Tool program is installed on a computer and communicating with a VariStroke actuator, the firmware number can be viewed and verified on the "System Information" page. Refer to the example screen capture below.
4. If the firmware program number is verified to be 5418-7525 or 5418-7897, then proceed to the next procedure to perform the required changes to the "Fault Detection Threshold High Limit Settings".

The screenshot shows the Woodward VariStroke-1 Actuator PC Service and Diagnostic Tool software. The main window displays the 'SYSTEM INFORMATION' page. The 'Firmware' field is highlighted with a red box, showing the revision number 'VS1 54187525NEW'. The interface includes a status overview, operating mode configuration, action buttons, and navigation buttons.

**Actuator Information:**

P/N	0
S/N	0
Revision	0

**Driver Information:**

P/N	6011360
S/N	21159486
Revision	13

**Servo Information:**

P/N	0
S/N	0
Revision	0

**Firmware Information:**

Firmware	
Revision	VS1 54187525NEW

**Temperatures:**

Electronics	32.9 °C	Alarm Limits: -45°C (Low) 115°C (High)
Servo	29.9 °C	Alarm Limits: -45°C (Low) 125°C (High)

**Operating Mode CONFIGURATION:**

Demand	0.00 %
Feedback	0.00 %

**Navigation Buttons:**

- System Information
- Config/Calibrate
- Manual Operation
- Input Config
- Output Config
- Alarms/Shutdowns

**Footer:**

Woodward, Inc. Industrial Turbomachinery Systems  
 This tool is for use with Woodward VariStroke-1 only.  
 Please notify Woodward, Inc. of any issues related to its usability or function.  
 Contact Woodward Support at

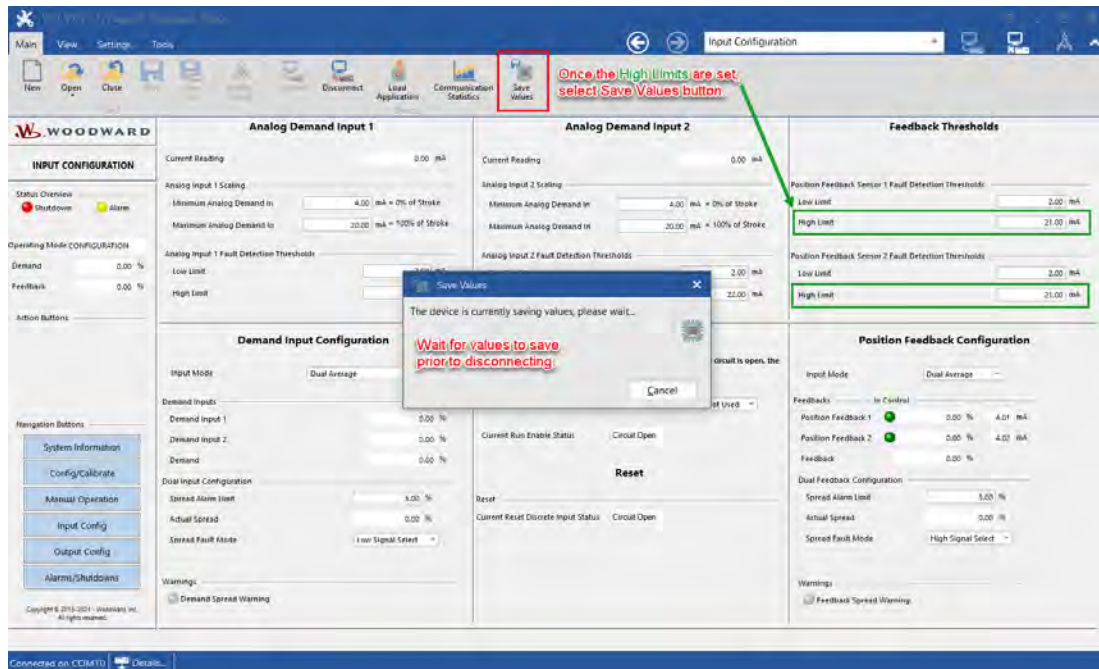
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### Fault Detection Threshold High Limit Settings Change Procedure:

1. From the top of the Customer Service Tool page, select the drop-down menu and choose the “Input Configuration” page.
2. Within the “Feedback Thresholds” section, select and change the Position Feedback “1 and 2” Fault Detection Threshold High Limit settings to 21mA.
3. Select the “Save Values” button at the top of the page to save the changed settings.



4. Optionally, users can confirm the settings have been successfully saved to the VariStroke's non-volatile memory by temporarily removing input source power from the VariStroke servo, reestablishing communications with the Customer Service Tool, then returning to the “Feedback Thresholds” section again to verify settings/changes.
5. Download and save the configuration file for backup. Go to the “Settings” tab at the top, select “Save from Device”, then follow the prompts.

If you have any questions or concerns about this issue, please contact Woodward's Technical Help Desk via [www.Woodward.com](http://www.Woodward.com) or contact your local customer service representative and reference this service bulletin 01679 for additional help.



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