

ADPS2-FS

Rev 1

June 2015

## Siemens PS2 Valve Positioner Fail-Safe Positions

When designing a process loop containing a valve and valve positioner, it is wise to consider the position the valve should go to, i.e., the valve's fail-safe position, in response to each potential system failure. Often valve position during a system failure is not considered until an actual failure occurs and the valve goes to an unexpected position. This can result in a hazardous situation for plant personnel, damage to process equipment, or loss of product or product constituents. Valve fail-safe position is implemented when piping a positioner to a valve actuator.

Table 1 shows the resulting actuator/valve positions for various positioner-to-actuator piping connections and with loss of input signal or supply air.

### PS2 Attributes

- Separate models for single and double acting applications.
- Single acting units vent output pressure upon loss of control signal and supply air.
- Double acting units: Y1 goes to maximum pressure & Y2 vents upon loss of control signal.
- Double acting units block and trap output pressure in actuator upon loss of supply air.
- Double acting units: If venting an output port upon loss of air is desired, we offer a venting gauge block to exhaust output port Y2.
- Units with "F01" in the model code (Fail-in-Place) block and trap output pressure in actuator upon loss of control signal. See Table 2

Part Number	Description
6DR4004-2RF	Venting gauge block, Aluminium
A6X30005120	Venting gauge block, SST

### DIGITAL COMMUNICATIONS

In addition to electric and pneumatic power, digital positioners require continuous digital communication for proper operation. Both Foundation Fieldbus and Profibus power and communicate with the PS2 using a single pair of wires. Therefore, it is possible to lose digital communication and have device power.

The following PS2 attributes will help you predict actuator position upon loss of digital fieldbus communications only; for loss of electrical and pneumatic power, see Table 1.

Table 1 Actuator Position after Various System Failures

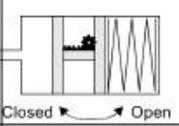
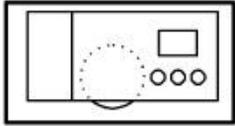
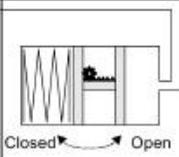
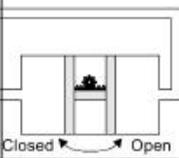
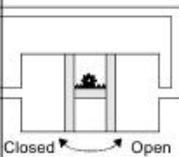
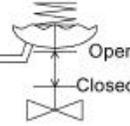
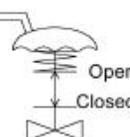
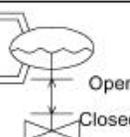
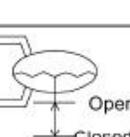
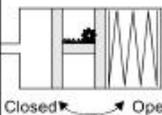
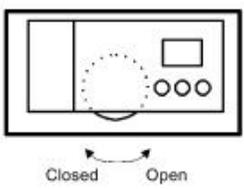
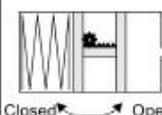
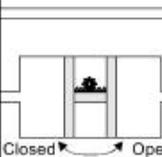
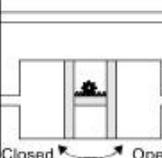
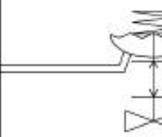
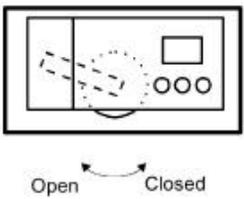
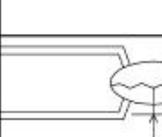
Actuating pressure Connection	Actuator type	Safety position after auxiliary power failure		
		Electric	Pneumatic	
Y1		Closed 	Closed 	<p>With part-turn actuators the counterclockwise direction of rotation - viewed on the actuating shaft of the valve - is defined as "Open".</p>  <p>Closed → Open</p>
Y1		Open 	Open 	
Y2		Open 	Last position (before auxiliary power failure)	
Y1		Closed 		
Y1		Closed	Closed	 <p>Open → Closed</p>
Y1		Open	Open	
Y2		Open	Last position (before auxiliary power failure)	
Y1		Closed		

Table 2 Fail-in-Place (F01) Actuator Position after Various System Failures

Actuating pressure Connection	Actuator type	Position following failure of auxiliary energy		
		Electrical	Pneumatic	
Y1		Hold in position	Hold in position	<p>With part-turn actuators, the direction of rotation opposite to the clockwise direction – when viewed onto the actuating shaft of the valve – is usually defined as "Open".</p> 
Y1		Hold in position	Hold in position	
Y2 Y1		Hold in position	Hold in position	
Y1 Y2		Hold in position	Hold in position	
Y1		Hold in position	Hold in position	
Y1		Hold in position	Hold in position	
Y2 Y1		Hold in position	Hold in position	
Y1 Y2		Hold in position	Hold in position	

**Profibus**

The following safety parameters are accessible using the local pushbuttons or Siemens' SIMATIC PDM<sup>1</sup> software.

**FSTY**, Fail Safe TYpe: Determines position of actuator upon loss of digital communication. This parameter has three choices:

**FSVL**, Fail Safe Value: Positioner will drive actuator to "FSVL" position, see FSVL parameter.

**FSSP**, Fail Safe Setpoint: Positioner will stay at last known setpoint before communication loss.

**FSAC**, Fail Safe factory: As per power failure modes indicated in above table:

- Single acting models - Y1 exhaust to zero pressure.
- Double acting models- Y2 exhaust to zero and Y1 increases to supply pressure.

**FSTI**, Fail Safe Time: Elapsed time after communication loss before going to safety position.

**FSVL**, Fail Safe VaLue: Safety position upon communication loss, pre-requisite: FSTY=FSVL

<sup>1</sup> Process Device Manager

**Foundation Fieldbus**

The following Analog Output Block safety parameters are accessible only via Foundation Fieldbus configuration software, i.e.: National Configurator.

**IO\_OPTS:**

Faultstate Type (bit 6) = 0 or unchecked will hold last position upon loss of communication.

Faultstate Type (bit 6) = 1 or checked will position actuator as per "FSTATE\_VAL" parameter.

**FSTATE\_VAL:**

Desired actuator position upon loss of digital communication, Faultstate Type must = 1.

**FSTATE\_TIME:**

Elapsed time after communication loss before going to safety position

**SAFETY SHUT DOWN**

Digital only positioners are equipped with an additional input to drive an actuator to the PS2's factory safety position; see Table 1. See Table 2 if unit has Fail-in-Place option.

To activate this feature, change position of '*Shut Down*' jumper located underneath secondary cover.

Once enabled 24Vdc must be maintain on terminals 81 and 82. Otherwise, the positioner will drive the actuator as shown in Table 1. See Table 2 if unit has Fail-in-Place option.

- Single acting models - Y1 exhausts to zero pressure.
- Double acting models- Y2 exhausts to zero and Y1 increases to supply pressure.

Once enabled, this feature will override any soft parameter settings as mentioned above.

<b>Siemens Industry, Inc.</b>	<b>APPLICATION DATA</b>
-------------------------------	-------------------------

**CUSTOMER/PRODUCT SUPPORT**

For support and the location of your local Siemens representative, refer to the table below for the URL of the Process Instrumentation portion of the Siemens public Internet site. Once at the site, click **Support** in the right column and then **Product Support**. Next select the type of support desired: sales, technical (see the table below), documentation, or software.

Online Support Request	<a href="http://www.siemens.com/automation/support-request">http://www.siemens.com/automation/support-request</a>
Technical Support	1-800-333-7421; 8 a.m. to 4:45 p.m. eastern time, Monday through Friday (except holidays)
Customer Service & Returns	1-800-365-8766 (warranty and non-warranty)
Public Internet Site	<a href="http://www.usa.siemens.com/pi">http://www.usa.siemens.com/pi</a>
Technical Publications in PDF	Click the above link to go to the Siemens Internet site and then click <b>Process Instrumentation</b> . In the column to the right, click <b>Support &gt; Manuals</b> . In the column to the left, select the product line (e.g. Pressure or Temperature or Controllers) to open navigation and search panes.

*All product designations may be trademarks or product names of Siemens Industry, Inc. or other supplier companies whose use by third parties for their own purposes could violate the rights of the owners.*

*Siemens Industry, Inc. assumes no liability for errors or omissions in this document or for the application and use of information in this document. The information herein is subject to change without notice.*

*Procedures in this document have been reviewed for compliance with applicable approval agency requirements and are considered sound practice. Neither Siemens Industry, Inc. nor these agencies are responsible for product uses not included in the approval certification(s) or for repairs or modifications made by the user.*

*The described equipment should be installed, configured, operated, and serviced only by qualified persons. For the purpose of this publication and product labels, a qualified person is one familiar with the installation, assembly, commissioning, and operation of the product, and who has appropriate qualifications for their activities. See equipment manuals for details.*