Siemens Industry, Inc.	Application Data

ADPS2-2
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SIPART 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

Consider the following PS2 attributes when selecting the PS2 model and determining piping connections to an actuator.

- 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 and 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.

Part Number	Description
A6X30005130	Venting gauge block, Aluminum
A6X30005128	Venting gauge block, SST

PS2 Direct and Reverse Action Parameters

Parameter "SDIR", Setpoint DIRection, determines the control action of the PS2. When set to "riSE" (default), PS2 outputs react as listed below. When "SDIR" is set to "FALL", the PS2 outputs react in the opposite manner.

- Single acting units: Output Y1 increases output pressure with an increase of input signal.
- Double acting units: Output Y2 increases output pressure with an increase of input signal.
  Output Y1 decreases output pressure with an increase of input signal.

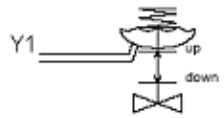
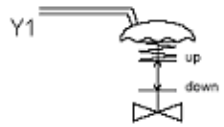
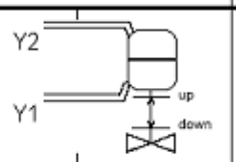
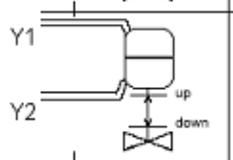
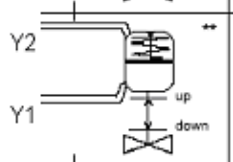
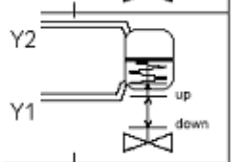
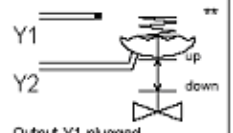
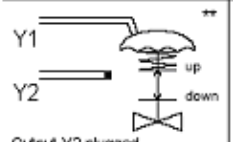
Parameter "YDIR" changes the action of the display only.
Note: This setting does NOT effect fail position as shown in the following table.

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

Positioner Connection	Actuator Type	Fail position after loss of: Input Signal	Fail position after loss of: Supply Air	Fail position after loss of: With exhaust type gauge block Input Signal	Fail position after loss of: With exhaust type gauge block Supply Air
6DR5x1.... Single Acting		Down to Spring position	Down to Spring position		
	Y1 vents to exhaust				
		Up to Spring position	Up to Spring position		
Y2 vents to exhaust Unit Double Acting 6DR5x2...		UP	Last position (before power failure)	UP	UP
		Down		Down	Down
		UP	Last position (before power failure)	UP*	Undetermined*
				UP	UP
		Down to Spring position	Last position* (before power failure)	Down to Spring position	Down to Spring position
		Down*		Down*	Undetermined*

* Could be an undesirable position
** Not a recommended installation

Profibus

The following safety parameters are accessible using the local pushbuttons or Siemens' SIMATIC PDM[1] 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

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.

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.
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.

[1] Process Device Manager

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 (PI) 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	http://www.siemens.com/automation/support-request
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	http://www.usa.siemens.com/pi
Technical Publications in PDF	Click the above link to go to the Siemens Internet site and then click **Process Instrumentation**. In the column to the right, click **Support** > **Manuals**. In the column to the left, select the product line (e.g. Pressure or Temperature or Controllers) to open navigation and search panes. Note: Navigation may change as the site evolves.