

PS2 Positioner Calibration Procedure Rotary & Linear Actuators

6DR5x1, 6DR5x2 (x = 0,1,2,3,5,6)

Verify the positioner is mounted correctly using factory couplings to insure there is NO BACKLASH between the positioner input shaft and the actuator output shaft. Check that there is sufficient supply pressure to operate the actuator/valve configuration. This is critical on spring return (single acting) actuators. Insufficient air pressure will result in a calibration error. **Confirm a 4 – 20 mA source is properly connected to the 2-wire positioner (x = 0 or 1), or a 2-, 3- or 4-wire positioner (x = 2 or 3).** Connect a 24 VDC power supply for Profibus (6DR55) or Foundation Fieldbus (6DR56) for bench top configuration. For complete details on the above, please refer to the “Operating Instructions” manual supplied on the CD in the positioner’s box. Under the Navigation tab, expand “electropneumatic positioners” and then “SIPART PS2”. Choose input source, i.e. 4-20 mA = “SIPART PS2 with and without HART.

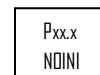
Positioner Calibration:

Remove the cover,

The PS2 has an LCD display and three (3) input buttons;



1 – When the positioner is powered up for the first time, the display will flash **NOINI** (no initialization) on the bottom right of the screen.

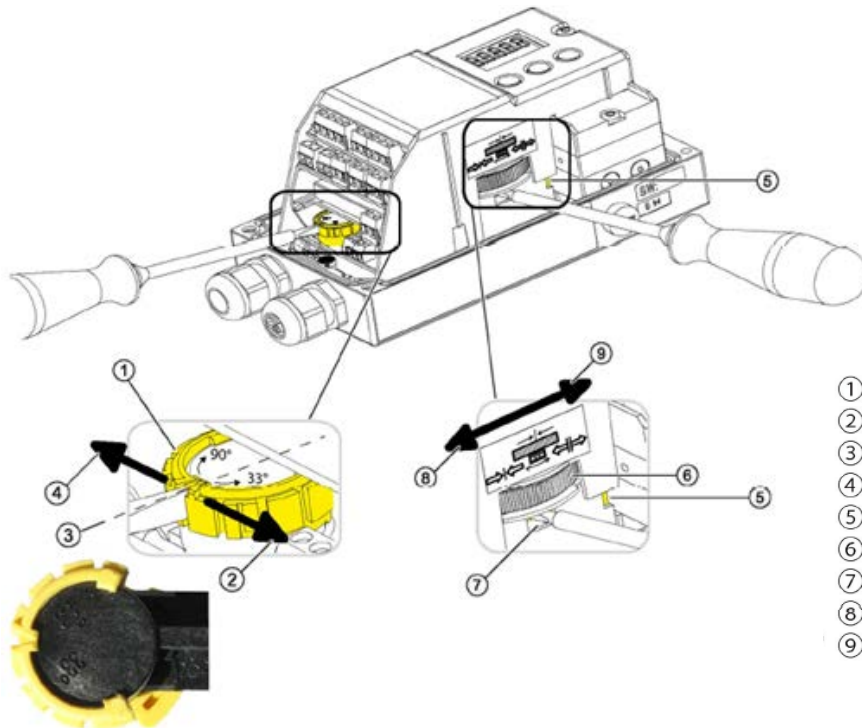


2 – Verify the valve/actuator moves freely from full closed to full open. Push and hold the Δ button, then push and hold the ∇ button. With both buttons pushed in this sequence, the actuator will **rapidly** move to one end position. *(If no movement occurs reverse the button sequence. Push and hold the ∇ button, then push and hold the Δ button.)* Once the actuator has reached the end position, reverse the push button sequence to **rapidly** move the actuator to its opposite position. To move the actuator **slowly**, push the Δ OR ∇ only. Place the actuator anywhere around mid-stroke by using one of the methods described above.

There are two mechanical adjustments for 33° and 90° degrees. One is the locking mechanism called the “Gear latch”, see item 1. The other is the transmission ratio selector, item 5.

IMPORTANT: The gear latch must be set to the neutral position BEFORE changing the transmission ratio selector. Otherwise, the actual gear will not engage.

3 – Verify the Gear Latch (1) is in the neutral position which is shown by the number (3) in the following illustration.



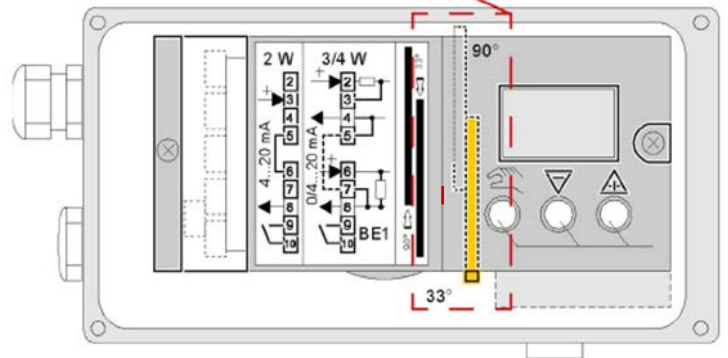
- ① Gear latch
- ② Locking transmission ratio to 33°
- ③ Neutral position
- ④ Locking transmission ratio to 90°
- ⑤ Transmission ratio selector
- ⑥ Friction clutch
- ⑦ Friction clutch latch
- ⑧ Locking friction clutch
- ⑨ Release friction clutch

Neutral Position

4 – Set Transmission Ratio Selector (Slide Bar) according to the actuator's requirements:

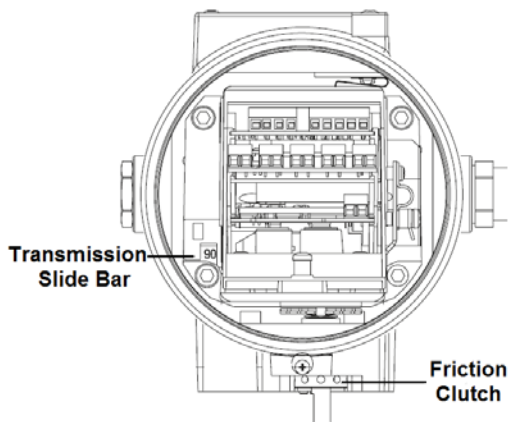
- **Rotary** - Always 90° (Step 4A)
- **Linear** less than 25 mm/1 inch = 33° (Step 4B)
- **Linear** greater than or equal to 25 mm/1 inch = 90° (Step 4B)

Proceed to adjust the gear latch to match the Transmission Ratio/Slide Bar.



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Flameproof Housing



4A – **Rotary Actuators** Check and insure the transmission bar is set to 90°. Using a small screw driver push the end of the yellow bar so it shows its yellow end on the opposite side from the “clutch wheel”

OR

4B – **Linear Actuators** Verify the transmission bar is set to 33° for a stroke less than or equal to 1inch/25 mm. Confirm the transmission bar is set to 90° for strokes greater than 1inch/25 mm. Using a small screw driver push the end of the yellow bar in to the correct position. See previous illustration for position details.

5 – Push and hold the  button until the display changes to setup mode; Subsequent starts **may** display a different menu parameter. The number in the lower left corner is the parameter number. Insure the parameter number is 1 by pushing and releasing the  button until Parameter 1 is reached.

6 – Using the Δ OR ∇ keys, scroll to appropriate actuator type. See description below.

- turn/-turn: Use this setting for a part-turn actuator with a directly mounted positioner.
- WAY/-WAY: Use this setting for a linear actuator with a carrier pin mounted on the lever.
- FWAY/-FWAY: Use this setting for a linear actuator with a carrier pin mounted on the actuator spindle. (Available with Profibus and Foundation Fieldbus, 2016)
- LWAY/-LWAY: Use this setting for an external linear potentiometer on a linear actuator.
- ncSt/-ncSt: Use this setting for an NCS sensor (6DR4004-.N.10 and -.N.40) on a part-time actuator.
- ncSL/-ncSL: Use this setting for an NCS sensor (6DR4004-.N.20) on a linear actuator for strokes < 14 mm (0.55 inch).
- ncSLL/-ncLL: Use this setting for an NCS sensor (6DR4004-.N.30) on a linear actuator for strokes > 14 mm (0.55 inch) and for an internal NCS module. No limitations apply to the internal NCS module.

In the case of actuators with inverted direction of action, use the settings with the minus sign, e.g. -turn.

Meaning of actuator with normal direction of action:

- Part-turn/rotary actuator closes when the drive shaft, positioner shaft or magnet of the NCS sensor rotates in the clockwise direction.
- Linear actuator closes when the actuator spindle rotates downwards and the positioner shaft or magnet of the NCS sensor rotates in the anti-clockwise direction.

Meaning for actuator with inverted direction of action:

- Part-turn/rotary actuator closes when the drive shaft, positioner shaft or magnet of the NCS sensor rotates in the anti-clockwise direction.
- Linear actuator closes when the actuator spindle rotates downwards and the positioner shaft or magnet of the NCS sensor rotates in the clockwise direction.


7 – Push the  button once to move to parameter 2. Set appropriate value as per actuator;

**FOR ROTARY ACTUATORS AND
FOR LINEAR ACTUATORS greater than 1inch/25 mm**

90°
2 YAGL

FOR LINEAR ACTUATORS with strokes less than 1inch/25 mm

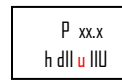
33°
2 YAGL

8 - Push the  button until parameter 4 is reached. The display will read; - - - - - >



9 – Hold the Δ button until the calibration starts, then release.

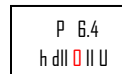
10 – If the actuator strokes and stops, and the display reads;
(the red color in this description is for recognition only);



The down tolerance has been exceeded.

(A) Confirm the transmission ratio bar is properly set for actuator stroke, see step 4.

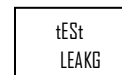
(B) Adjust the Friction Clutch so the P number is 6.4 or as close as possible. The red character should change to a large 0.



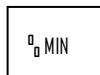
Note: The Friction Clutch should rotate easily with thumb pressure. If not; adjust the yellow wheel (located just below the knurled thumb wheel – **inside the housing, except Flameproof version**) with a small screw driver, by rotating it TO THE RIGHT. This will loosen the friction clutch and allow rotation of the thumb wheel. Refer to the diagram in step four to locate the thumb wheel, Item 6.

(C) Push the Δ button to continue.

11 – At the end of RUN 3, the display will show the opening and closing speed of the actuator. During this display, hold the Δ button for 2 seconds. This will initiate the **LEAK**age test. Display reads;




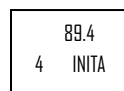
12 – At the end of the **LEAK**age test, the display will show the leak rate in % of stroke per minute.




13 – Push the Δ button to continue with auto calibration. There are a total of 5 Runs. At the completion of RUN 5 the display will read;



14 – Push the  button once. The display reads;




15 – At this point the positioner is calibrated for the valve assembly. The next step is to go to “AUTOMATIC OPERATION” or any of the remaining parameters.

16 – To return to automatic mode, press and **hold** the  button for 5 seconds.

The display will automatically change to show it is in Manual Mode. The valve can be manually operated from here using the Δ OR ∇ , if required.



17 – Push the  button once. The display will show;



Note: For Profibus and Foundation Fieldbus please see the following section.

A 4-20 mA positioner should now respond to the control signal. A digital unit such as Profibus or Foundation Fieldbus requires other steps for communication. Manual mode can be used for bench testing various positions without the need for a digital network.

- A Profibus unit will also need to have the address set. The address can be changed in the configuration menu. Factory default is 126.
 - o This parameter is Station Number, **STNR**. The parameter number is different depending on firmware revision. Check Leaflet provided inside the housing for parameter number.
- Foundation Fieldbus requires a special process for configuring the function blocks in order to control the valve. For help with the communication step, contact Siemens Technical Support.

How to reverse the action:

If it is found that the valve action is backwards for the application, there are two ways to address this but one requires re-initialization.

One (Requires re-calibration procedure):

The **best choice** is to change Parameter 1 to the inverse function and then run the Auto-calibration again. For example, if Parameter 1 is set to “turn”, then change it to read “- turn” via the Δ and ∇ buttons. Repeat calibration.

Two (No re-calibration procedure):

This procedure inverts the physical action and display of the positioner for 4-20 mA and Profibus units. Foundation Fieldbus requires a configuration change within one of the function blocks. It cannot be done with the push buttons.

4-20 mA PS2/Profibus

Parameter 7(4-20mA) reverses the physical action. Profibus=Parameter 6

- From AUT or MAN mode, press [HAND] button for 5 seconds. Observe number in the lower left hand corner.
- Continue to press [HAND] button until Parameter 7/6 is reached.
- If Parameter 7/6 displays “rise” change to “fall” or vice versa.
Use [+] and/or [-] to change option.

Parameter 38 reverses the display and feedback. Not needed in Profibus

- Continue to press [HAND] button until Parameter 38 is reached.
- If Parameter 38 displays “rise” change to “fall” or vice versa.
Use [+] and/or [-] to change option.
- To return to Automatic mode, press and hold [HAND] button for 5 seconds.

The unit will now be in Manual mode.

- Press [HAND] button one time to return to Automatic mode.

Note: If using the alarm card, tight closing, or advance diagnostics, the values may not match actual valve position. Recommend *Option One* for reversing action when possible.

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	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.