**Choose the right test tool**

The tool you choose for valve positioner testing needs to maximize productivity and provide results you can count on. The table below lists some of the key features to look for and shows how the Fluke 789 ProcessMeter™ meets those requirements:

<table>
<thead>
<tr>
<th>Key valve positioner test tool requirements</th>
<th>Fluke 789</th>
</tr>
</thead>
<tbody>
<tr>
<td>Signal sourcing to simulate a controller connected to a valve positioner's input</td>
<td>✓</td>
</tr>
<tr>
<td>Adjustable source current ramping</td>
<td>✓</td>
</tr>
<tr>
<td>Portability, durability, accuracy, and ease of use</td>
<td>✓</td>
</tr>
<tr>
<td>Testing and calibration features in a single tool</td>
<td>✓</td>
</tr>
</tbody>
</table>

As the table indicates, the Fluke 789 Process-Meter brings all the necessary capabilities to the job site for checking and recalibrating electronic valve positioners. It simulates a current loop transmitter and offers a wide range of digital multimeter (DMM) measurements including AC/DC volts, AC/DC current, resistance, frequency, MIN/MAX, Relative measurements, Diode Test, and AutoHold. Designed specifically for loop process technicians, the Fluke 789 also complies with the IEC 1010-1 standard for CAT III 1000 V environments.

For wireless logging and collaboration capabilities you can purchase the Fluke 789 FC ProcessMeter™ and Temperature Kit. The kit includes a temperature measurement module and an FC Connector that gives you access to the full benefits of the Fluke Connect™ app.

**Six steps to check valve positioning**

The following are the basic steps for making position checks on a valve positioner. Always consult the valve manufacturer’s specific instructions for proper and appropriate positioner testing and calibration.

1. Set up the Fluke 789 ProcessMeter in sourcing mode and connect to valve
2. Test valve closing
3. Test valve opening
4. Test span position
5. Test linearity
6. Test valve for smooth operation

Valves, the actuators that move them, and the electronic circuits that control them, endure tough daily use. A valve may be stroked from hundreds to tens of thousands of times over a one-year period. This causes screws to reposition, springs to weaken and mechanical linkage to loosen. The valve seat wears both from the repeated seating of the valve, and from the liquid or gas that passes through it.

In addition, electronic components experience “calibration drift” causing valves to not fully open or close, to close prematurely, or to operate erratically resulting in improper regulation of the gas or liquid under their control.

To avoid this, it is important to establish a preventive maintenance program to regularly check valve positioners in the field. These checks need to be conducted quickly to minimize down time, and be followed by quick recalibration when calibration drift is found.
Valve Positioning
Preventive Maintenance Checklist

**STEP 1 Set up**

Set up the Fluke 789 ProcessMeter in sourcing mode using the appropriate range of current for the positioner.

- Connect the test leads to the mA source output jacks on the Fluke 789.
- Select the 4-20 mA range by moving the rotary function switch from Off to the orange upper mA output position.
- Connect the Fluke 789 to the input terminals of the valve.

**STEP 2 Test valve closing**

To determine whether the positioner fully closes the valve at the 4.0 mA current level:

- Adjust the source current to 4.0 mA on the Fluke 789 ProcessMeter by pressing the 0 % button below SpanCheck button.
- While watching the valve for any movement, press the Coarse Down button once to decrease the current to 3.9 mA. There should be no movement of the valve.
- Adjust the zero adjustment on the valve positioner to set the valve for the closing you desire.

**STEP 3 Test valve opening**

To check the opening of the valve, press the Coarse Range button up from 4.0 mA. The Fluke 789 ProcessMeter will increase 0.1 mA for each press of the Coarse Range button.

**NOTE:** In setting the point at which the valve starts to open, be sure there is no counter pressure by the actuator against the force holding the valve closed when there is 4.0 mA on the controller’s input. That means:

- In a spring-to-close valve, there should be no pressure on the diaphragm.
- With a double acting piston actuator, there should be no pressure on one side of the piston.
- You can set the start of the valve opening between 4.1 and 4.2 mA to ensure that there is no counter pressure against those forces at the closed setting.

**STEP 4 Test span position**

The span position check tests the valve in the fully open position.

- Press the SpanCheck 100% button which gets you to 20 mA. Use the range buttons on the Fluke 789 ProcessMeter to adjust the source current for a 20 mA reading and wait for the valve to stabilize.
- While watching or feeling for valve movement, press the Coarse Up range button once to 20.1 mA.
- Using the Coarse control button, adjust current up and down between 20.1 mA and 19.9 mA. There should be no movement of the valve stem from 20.1 to 20 mA and slight movement from 20 mA and 19.9 mA.

**TECH TIP:**

In most valves, there is an interaction between the zero and span settings of a valve controller. Therefore, it is best to ensure proper valve position adjustment by repeating the test of the fully closed and fully open positions until no further adjustment is necessary.
Valve Positioning Preventive Maintenance Checklist

**STEP 5 Test linearity**

For valves with linear action:
- Set the Fluke 789 to 4 mA
- Using the % Step button, step the current to 12 mA (50%) and confirm the valve position indicator is at 50% travel.

**NOTE:** If your valve is a non-linear type, refer to the valve manual for proper operation.

**STEP 6 Test valve for smooth operation**

- Set the rotary switch to the lower output mA and select the Slow Ramp function using the blue button.
- Allow the Fluke 789 to ramp through several cycles while you watch or feel for any abnormal valve operation. The valve should NOT oscillate or hunt at any of the step positions of the Slow Ramp, nor should the valve be sluggish.
- Set the gain of the valve controller to a point that gives the best response between these two conditions.

**SAFETY TIPS:**
- Always ensure that the staff responsible for the process you are working on is informed of your intentions prior to making any checks of valve operation.
- Be alert when touching any moving machinery.
- Always consult manufacturer’s specific instructions for proper and appropriate valve positioner testing and calibration.

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Five ways Fluke Connect capabilities enhance valve positioner field testing

The Fluke 789 FC ProcessMeter™ and Temperature Kit delivers all the power and capabilities of the Fluke 789 ProcessMeter along with the FC Connector that gives you access to all the capabilities of the Fluke Connect™ app on your smart phone, including the ability to:

1. Archive measurements to EquipmentLog™ history in Fluke Cloud™ storage for documentation and future reference in the field.
2. Compare real-time measurements to historical data.
3. Connect with other technicians and your manager through a ShareLive™ video call, to show them exactly what you’re seeing and get instant feedback.
4. Move further away from hazardous areas by setting up the Fluke 789 FC ProcessMeter at the valve and viewing the results on your smart phone.
5. Access digital product manuals, Fluke application notes, and other resources from the field through your smart phone.

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