

Stem Angle Measurement Device (SAMD)

Key Features

- Measures and documents full stroke stem rotation angle
- No modifications needed at the valve or actuator
- Non-Intrusive fixturing is easily assembled and installed in place of the stem protector cover
- Kit adapts to all Limitorque SMB/SB sizes as well as Rotork A7-91 actuators
- Unique magnetic stem attachment assemblies make for easy connection to stems with diameters of 0.625 inches and up
- Angle and travel measurements are taken into QUIKLOOK FS along with all other AF/AL data on typical tests
- Stem angle resolution of $\pm 0.009^\circ$
- Stem travel sensor facilitating 34 inches of measured travel
- Usable for As-Found testing as required by ASME code
- SAMD sensors use TEDS plug and play technology
- SAMD Kit is offered in a convenient shipping and storage case



**SAMD shown mounted on SMB-000 Limitorque actuator*

Teledyne LeCroy Test Services (TLTS) has developed a device to measure stem angular motion during MOV diagnostic tests. The SAMD addresses the need to monitor this parameter on Anchor Darling Double-Disc Gate Valves which are susceptible to wedge pin failures possibly leading to stem-disc separation. The SAMD can be used to periodically monitor and trend stem rotation for the entire valve stroke with extreme accuracy through the use of a state of the art digital rotary encoder with unique and versatile fixturing. For most gate valves, the SAMD would be capable of monitoring valve in-body disc guide clearance change over the entire valve stroke and service the industry's need to monitor valve obturator position as required by recent NRC regulations.

Full Stroke Operation

During diagnostic testing it is important to obtain stem rotation data over a complete open and close stroke so that any stem to disk rotation can be identified. Collecting rotation data over the full stroke also establishes a baseline profile that can be trended. The SAMD is capable of measuring both stem angle and travel over stroke lengths up to 34 inches.

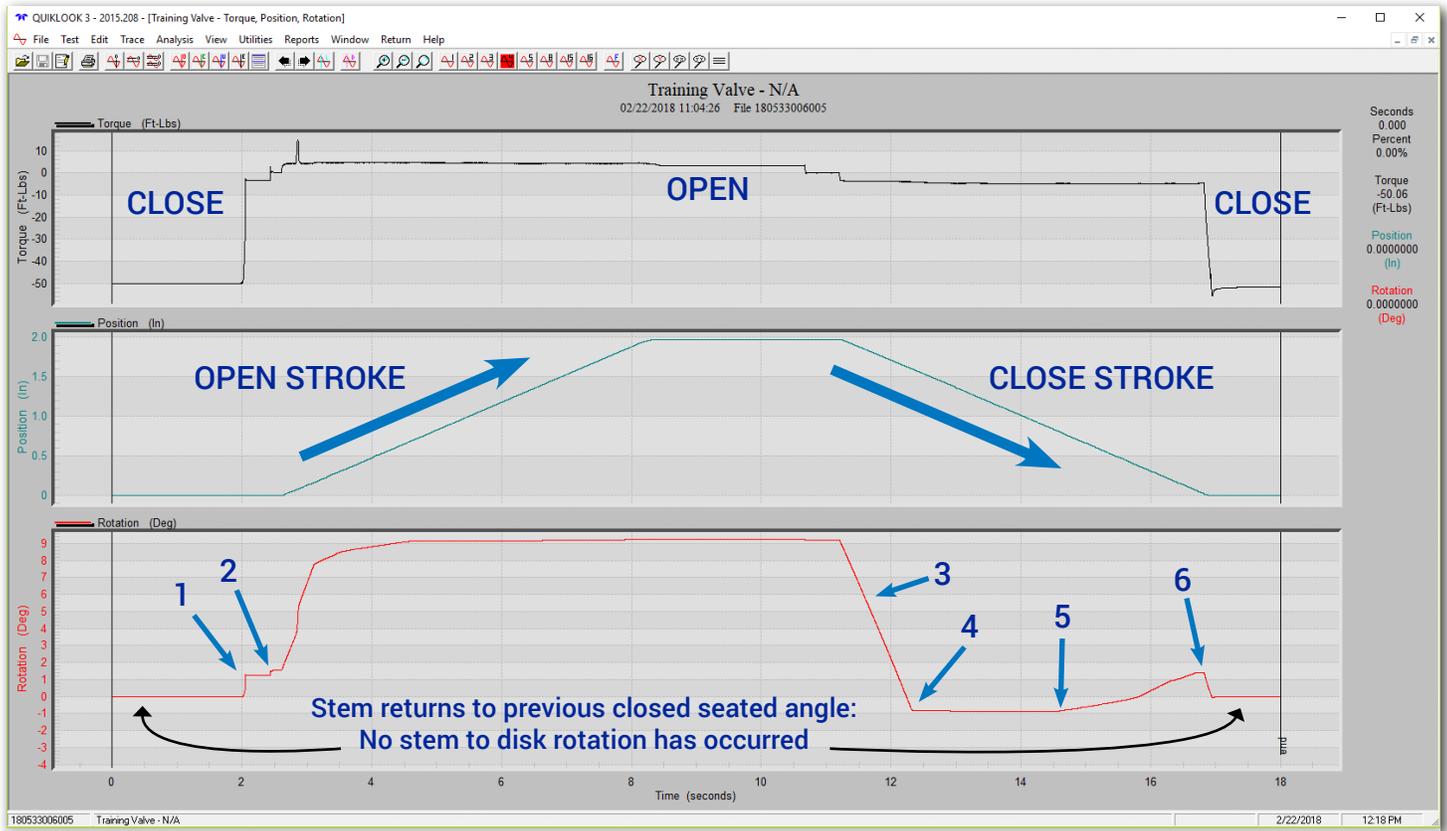
Accurate and Repeatable

The Teledyne SAMD Kit includes a 50" Stem Position Encoder which has an accuracy of $\pm 0.020''$ and a Rotary Encoder which has an accuracy of $\pm 0.14^\circ$.

Adaptable to Many Actuator Types and Sizes

The SAMD has been designed to be compatible with Limitorque SMB/SB/SBD 000 through 5 and Rotork A7 through 91 actuators. The kit is supplied with an additional set of 9 & 18 inch extension rods to accommodate maximum stem travel of up to 34 inches. The kit also contains the necessary adapter plates to mate with the full range of stem protector NPT threads as well as optional accessories for various top-of-stem configurations including SmartStems. The Stem Position Encoder (SPE) adds a second critical characteristic that can assist the user with stem travel measurements and limit switch setup.

STEM ANGLE MEASUREMENT DEVICE



The QUIKLOOK FS screen shot above shows a close-open-close test performed on a Borg Warner 2" gate valve with a standard T-Head connection in good working condition. The channels displayed are **Torque**, **Stem Travel (Position)**, and **Stem (Angle)**. As the test begins, the **Angle** channel can be seen to rotate a little more than a degree with torque relaxation¹, a smaller amount at hammer blow² and then roughly 8 degrees more throughout the balance of the open stroke for a total angular rotation of 9.2 degrees. During the initial part of the close stroke³ the stem rotates at a constant speed until the T-Head clearance is taken up⁴. At 15 seconds into the test, the disk enters the guides⁵ and straightens up until it begins to go into the seat⁶. At this time the stem twists in response to seating torque. Total angular travel during the close stroke is 9.2 degrees confirming that no stem to disk rotation has occurred.

Ordering Information

Product Description	PN#
Stem Angle Measurement Device (SAMD) Kit	160705

SAMD Kit includes:

- (1) precision thru-bore rotary encoder and carrier plate assembly,
- (1) 50 inch Stem Position Encoder,
- (8) adapter plate assemblies,
- (1) base plate with (3) permanent 9" linear rods,
- (2) sets of (3) extension rods (9" & 18"),
- (3) stem extension tubes (SM, MD, LG),
- (3) magnetic stem attachment assemblies (SM, MD, LG),
- (1) set of optional SmartStem accessories.

* Please identify the target valve population including actuator type and size, stem diameter, stem travel and stem end configuration.



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