

Zero Flow Calibration

Overview

The Zero Flow calibration test provides functional diagnostic information about your Kurz flow meter. This information includes sensor cleanliness, sensor and electronics functionality, and system damage or changes that caused potential calibration drift.

Note The Zero Flow calibration test only demonstrates that minimum functionality of the flow meter has been maintained after installation. The test does not account for field-specific installation criteria.

This document assumes you are familiar with B-Series login and menu structure. Refer to the *B-Series Operations Guide* for additional information.

Before performing this test, you will need:

- A Zero Flow calibration chamber. Kurz recommends the chamber specified in “Zero Flow Assembly Parts” on page 6 and shown in Figure 5 and Figure 6.



- The Calibration Data and Certification document for the device under test. Contact Kurz if you are unable to locate your original documentation.

Performing A Zero Flow Calibration Test

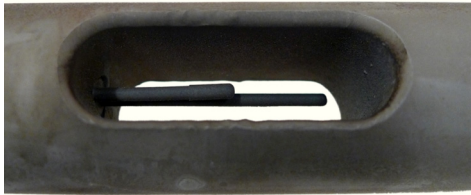
To perform a Zero Flow calibration test:

- 1> Remove the probe support from the process.

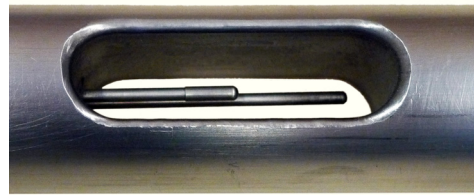
Follow all required safety precautions, as determined by company policy.

- 2> Visually inspect sensor for cleanliness.

If the sensor appears dirty, gently use a cellulose/synthetic fiber scour pad (such as Scotch-Brite®) or emery cloth to remove hard deposits.



Example of Dirty Sensor



Example of Clean Sensor

Figure 1. Dirty and clean sensors

Important *Do not use harsh abrasives such as sandpaper, steel wool, or a sharp edge to remove any deposits. These can damage the sensors. Use an acid-based solvent if necessary.*

Be careful handling the sensors.

Important *Applying too much pressure on the sensors can bend or damage them.*

- 3> Use a suitable chamber for Zero Flow testing.
Kurz recommends the chamber specified in “Zero Flow Assembly Parts” on page 6 and shown in Figure 5 and Figure 6.
- 4> Slide the Zero Flow chamber over the probe support so that the sensing element is located in the center of the chamber and the Y-Port is down.
- 5> Hand-tighten the Swagelock assembly.
- 6> Ensure the probe support is horizontal with the flow arrow pointing horizontally, as shown in Figure 2 and Figure 3.

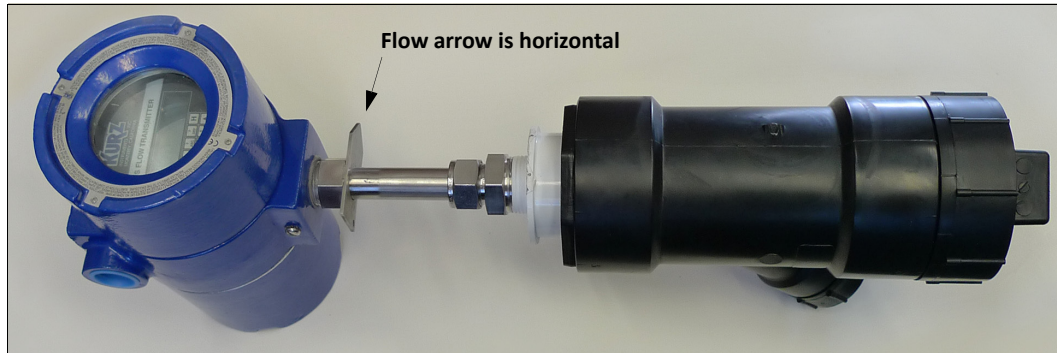


Figure 2. Flow meter position for Zero Flow calibration test — example

The flow meter was originally calibrated horizontally, and changing the position will change the reading.

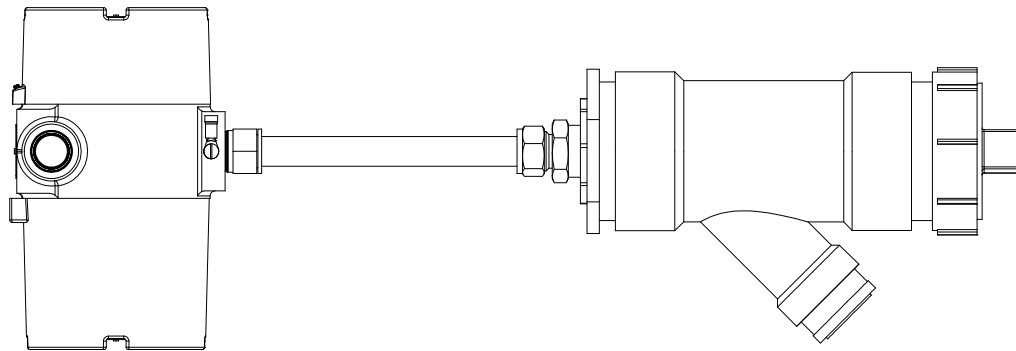


Figure 3. Flow meter position for Zero Flow calibration test — illustration

- 7> Power the meter on and wait for it to complete its startup self-diagnostics.
- 8> Remove the enclosure lid to access the display/keypad.
- 9> To view the Flow Data information in Display mode:
 - a> Press **D**.
 - b> Press **2** to invoke the Quick Jump option.
 - c> Press **42** for the Flow Data menu, and then press **E**.

TAG 500000A
RT 6649.86 HRS

- d> Press **D** until the PRP prompt appears.

PRP= x.xxxxx W
AT x.xxxxx SCMH

Note The Rp Power value (PRP field), Velocity value (AT field), and flow units are specific to your flow meter. The flow units can be KGH, KGM, PPH, PPM, NCMH, NLPM, SCFH, SCFM, SCMH, or SLPM.

The data is unfiltered and unaltered by any programmed bias, blockage, or velocity correction factors defined for the flow meter.

- e> Wait 2 minutes and record the Rp Power value in Watts. If exact accuracy is required, wait up to 20 minutes before recording the Rp Power value.
- f> Press **H** twice to exit.
- 10> Locate the zero flow Rp Power column in the Calibration Data and Certification Document provided with the flow meter, or contact Kurz if you are unable to locate your original documentation.

Figure 4 shows an example of a Calibration Data and Certification Document. The zero flow point is highlighted with Rp Power = 1.9357 W.

CALIBRATION DATA AND CERTIFICATION DOCUMENT
KURZ INSTRUMENTS, INC.
 2411 GARDEN ROAD
 MONTEREY, CA 93940
 1(800) 424-7356 831 646-5911 FAX 831) 646-8901
 www.kurzinstruments.com

SENSOR CALIBRATION DATA
 Serial No/Filename: 007VC
 Calibration Date: 09/01/2013
 Customer Code/Customer Name: 007VALUEDCUSTOMER
 Purchase Order No: 7500F2
 Model No: 454FTB
 Part Number: 500000-A-3000-B-1-C-200-D-10-E-1-F-3000
 MAPICS Item No: 0007500
 Flow Units: SMPS
 Reference Fluid: Air
 Standard Conditions (English & Metric Units): _25 Degrees C and _760 mmHg

	Point No.	Rp Power W dc	Velocity SFPS	Velocity SFPM
Zero flow point	1	1.9357	0.0000	0.0000
	2	2.4478	0.2735	53.841
	3	3.3930	0.8331	164.010
	4	4.8758	2.8006	551.332
	5	7.1551	9.6224	1894.258

NOTE: Power was measured directly by the calibrated unit.

VTM Data Derived from the following Measurement Components
FLOW ELEMENT CALIBRATION REFERENCE **DATA ACQUISITION SYSTEM**
 Model No: 454-08 S/N:DL11001A Model No: 615MF-0900
 NIST Calibration Due Date:09-09-2013 Serial No: 010101A

This instrument was calibrated with measuring and test equipment with certified NIST traceability. Copies with applicable NIST number are available upon request. The calibration of this instrument was performed in accordance with the requirements of ISO-9001, ANSI/NC SL Z540 and ISO/IEC GUIDE 25.

WIND TUNNEL OPERATOR: _____ DATE: _____
 QUALITY CONTROL: _____ DATE: _____

Figure 4. Calibration Data and Certification Document example

- 11> Calculate the error associated with the data collected above and the zero flow point data on the Certification document.

Equation : $\% \text{ Error} = \frac{|\text{Disp PRP} - \text{Cal PRP}|}{\text{Cal PRP}} \times 100$

where:

Disp PRP = Zero flow point value (W) recorded from the display

Cal PRP = Zero flow point value (W) on the certificate

Example : $2\% \text{ (pass)} = \frac{|1.9746 - 1.9357|}{1.9357} \times 100$

If the Rp Power reading is within +/-3% then the sensor is clean and the flow calibration has not drifted. If it is not within 3% then gently clean the sensor as described in Step 2 on page 2. Repeat the test to obtain a new Rp Power value. If 3% is not achievable then return the device to Kurz for evaluation and possible re-calibration.

Zero Flow Assembly Parts

Table 1 lists the parts used for building a Zero Flow chamber shown in Figure 5.

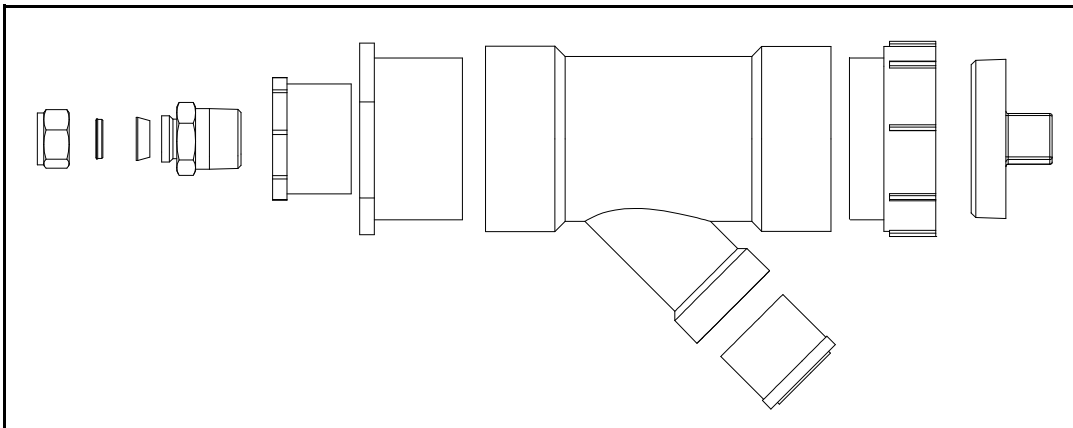


Figure 5. Zero Flow calibration chamber — exploded view

Table 1. Zero Flow Chamber Parts List

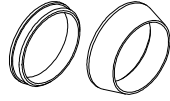
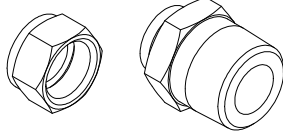
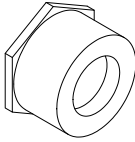
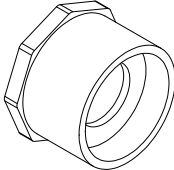
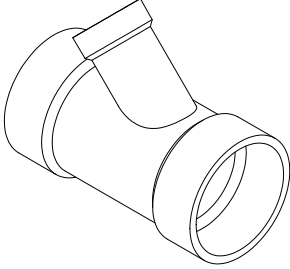

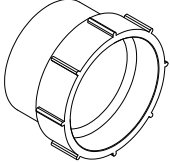
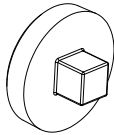

Quantity	Description	Image
1	Nylon front and back ferrules	
1	1" MNPT Swagelock assembly with 3/4" or 1" through hole (based on probe support diameter)	
1	1" to 2" FNPT PVC bushing reducer Note: A single 1" to 3" bushing reducer can replace the 1" to 2" and 2" to 3" bushing reducers.	
1	2" to 3" FNPT PVC bushing reducer Note: A single 1" to 3" bushing reducer can replace the 1" to 2" and 2" to 3" bushing reducers.	
1	3" x 1 1/2" ABS Y-branch fitting	
1	1 1/2" PVC plug	
1	3" FNPT ABS coupler	

Table 1. Zero Flow Chamber Parts List (continued)

Quantity	Description	Image
1	3" MNPT ABS end cap	
	ABS or PVC cement	

Assemble and glue the parts together as shown in Figure 6.



Figure 6. Zero Flow calibration chamber — assembled