USER MANUAL

FUNCTIONAL TEST MODULE
H_2S FTM – Z2600-0918
LOW LEVEL H_2S FTM – Z2600-0930

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Z2600-0918
H_2S Functional Test Module

Z2600-0930
Low Level H_2S Functional Test Module

Operation Manual

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An up-to-date electronic copy of this manual can be found on the AZI website at http://www.azic.com.

IMPORTANT INSTRUCTIONS – READ THIS FIRST

CAUTION: THE UNIT MUST BE UNPLUGGED IF THE PERMEATION CHAMBER COVER PLATE IS REMOVED FOR ANY REASON. THE SOURCE OF H_2S WILL BE INSTALLED UNDER THIS COVER PLATE AND WILL NEED TO BE REPLACED (AT THE FACTORY) WHEN DEPLETED. A WELL-VENTILATED AREA, PREFERABLY A FUME HOOD, SHOULD BE USED WHEN REMOVING THE COVER PLATE, REMOVING THE PERMEATION TUBE OR FILTERS, AND CLOSING THE COVER PLATE.

NOTE: DO NOT STORE OR OPERATE THE FUNCTIONAL TEST MODULE (FTM) AT TEMPERATURES EXCEEDING 120°F OR 49°C.

NOTE: PLEASE SAVE ALL PACKAGING MATERIAL, H2S SHIPPING CYLINDER, ETC., TO REPACKAGE UNIT FOR SHIPMENT BACK TO THE FACTORY FOR RECALIBRATION.

NOTE: IT IS UNLAWFUL TO SHIP THE FTM BY COMMON CARRIER WITH THE H_2S PERMEATION TUBE INSTALLED. (THE PERMEATION TUBE IS CLASSIFIED AS HAZARDOUS CARGO.) IF THERE ARE ANY QUESTIONS OR YOU NEED ASSISTANCE, CALL AZI CUSTOMER SERVICE TOLL FREE AT (800) 528-7411.

NOTE: REFER TO THE JEROME® 631-X OR JEROME® J605 OPERATION MANUALS FOR SPECIFICS ON THE OPERATION OF THE HYDROGEN SULFIDE ANALYZERS.

INTRODUCTION

- A hydrogen sulfide gas sample of known concentration is generated from the Functional Test Module (FTM) and introduced into the Jerome® 631-X or J605 Hydrogen Sulfide Gas analyzer. If the H_2S level shown on the instrument's display falls within the expected range, you may be confident that your analyzer is functioning properly. Refer to the Jerome® 631-X or Jerome® J605 Operation Manuals for specifics on the operation of the hydrogen sulfide analyzers.

- Passing a known flow of clean, dry air at a fixed temperature over an H_2S permeation tube generates the sample gas concentration. The flow rate and temperature are factory set to provide a measured concentration of H_2S gas.
  - Approximately 250 ppb (0.250 ppm) +/- 20% for FTM model Z2600-0918.
  - Approximately 30 ppb (0.030 ppm) +/- 20 % for FTM model Z2600-0930.

- Depending on the frequency of use, the FTM's H_2S permeation tube should last anywhere from three (3) months to two (2) years. The permeation tube may be nearing exhaustion when the Jerome® analyzer reads an output of less than 20% of the expected concentration.

- Use of the FTM can be beneficial to:
  - Verify that the Jerome® Analyzer is operating.
  - Verify that the Jerome® Analyzer is reading correctly if unexpected readings are encountered during sampling operations.
  - Comply with a company's routine maintenance requirements.

- Sampling the H_2S output of the FTM does not calibrate the Jerome® 631-X or J605. The Jerome® Analyzer can only be calibrated using a sophisticated NIST traceable calibration system at the factory or an authorized calibration laboratory. Although the calibration interval depends on the amount of use and your quality specifications, the recommended factory calibration interval is one year.

- Several factors can affect the test results obtained from the H_2S FTM used with the Jerome® Analyzer. Operator technique and environmental factors are the most important.
  - Operator technique factors include:
    - ⇒ The amount of "wait" time allowed after sensor regeneration (film heat),
    - ⇒ The frequency and number of samples taken, and
    - ⇒ The placement of the equipment where extremes in temperature and airflow will occur.
  - Environmental factors:
    - ⇒ Some variation in H_2S concentrations will occur with changes in temperature, altitude and barometric pressure even though the instrument is automatically compensated for changes in ambient temperature and pressure.
    - ⇒ Other gases may combine with H_2S to reduce the concentration and reduce the reading.

- The FTM has feet on three of its sides. The FTM can be oriented on whichever set of feet is best for your situation and application. Performance is not affected by the orientation.

COMPONENT LOCATION & IDENTIFICATION

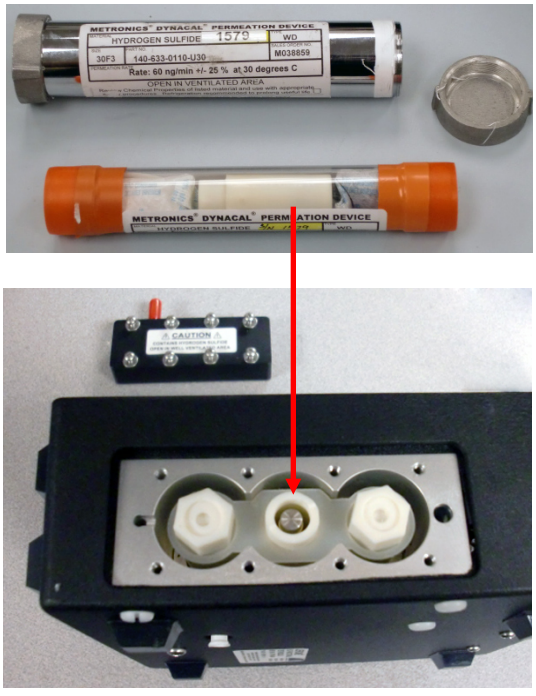
The major components of the FTM are identified in the diagram below:

There is also a male luer exhaust port on the back of the module (not pictured).

MODULE SETUP

H_2S PERMEATION TUBE INSTALLATION

- In a fume hood or well-ventilated area, remove the eight screws from the permeation chamber cover plate. Remove cover plate (with gasket) from the module and remove the centering plate from the chamber.
- Unscrew the metal cap from the permeation tube shipping cylinder and slide out the plastic tube. The plastic tube contains the permeation tube assembly and several bags of absorbent material.
- Remove the permeation tube assembly from the plastic tube, and install it, with the small end up, in the center hole of the permeation chamber (between the two filters), as shown. Be sure to save the shipping materials.
- **Reinstall the centering plate and make sure all three cylinders are positioned in the centering plate holes, as shown, before reinstalling the cover plate.**



- Install two guide pins diagonally across from each other in each end of the permeation chamber.
  - Thread the pins in finger tight.
- Make sure the gasket is aligned properly over the screws on the cover plate, then position the cover plate (with gasket) back on the unit using the guide pins for alignment and with the sample gas outlet facing the front of the unit (as shown in the large overview picture on the previous page).
- Start the six screws in the plate's remaining screw holes, THREADING them in only slightly.
- Remove the two guide pins using the 5/64" Allen wrench. Start the two remaining screws in the same holes.
- PROGRESSIVELY tighten all eight screws evenly from the middle positions to the ends. After tightening all eight screws, start again from the middle positions and ensure all eight screws are tight.

FLOW SYSTEM CHECK

- Connect the unit to 110 VAC line power and turn the unit on.
- Cover the hole in the desiccant fill cap with a finger or cap.
  - The "PUMP" light should be on continuously and the sound of the pump may get louder.
- Cover the exhaust port on the back of the module with a finger or cap.
  - The "PUMP" light should be on continuously and the sound of the pump may get louder.

  The flow system is operating properly if the “PUMP” light remained on.
- Turn the module off and disconnect it from the 110 VAC power.

PERMEATION TUBE REMOVAL

CAUTION: A SMALL AMOUNT OF H_2S MAY BE RELEASED DURING THIS PROCEDURE. THEREFORE, THE REMOVAL OF THE PERMEATION TUBE MUST BE PERFORMED IN A WELL-VENTILATED AREA OR DIRECTLY UNDER AN EXHAUST HOOD.

NOTE: IT IS UNLAWFUL TO SHIP THE FTM BY COMMON CARRIER WITH THE H_2S PERMEATION TUBE INSTALLED. IF THERE ARE ANY QUESTIONS OR YOU NEED ASSISTANCE, CALL AZI CUSTOMER SERVICE TOLL FREE AT (800) 528-7411.

- Remove the eight screws and washers from the permeation chamber cover plate.
- Remove the centering plate, filters and permeation tube as needed.
  - Ensure the permeation tube is placed in the original container and return it with the FTM to Arizona Instrument for calibration. At the factory, the perm tube will be reinstalled in your module for calibration. **The FTM must be calibrated with the perm tube and filters in place. The perm tube and filters cannot be replaced in the field.**

ACCESSORIES & MAINTENANCE PARTS

- The FTM includes the following parts:

Item Name	Item Part Number
FTM	Z2600 0918
or Low Level FTM	Z2600 0930
Perm Tube Assembly	
Perm Tube Housing	1400 3196
0.63” Diameter Fritware	2600 3054
0.250 ppm Perm Tube	1300 1025
or 0.030 ppm Perm Tube	1300 1040
This FTM Operation Manual	700-0095

  The perm tube and internal filters can last up to two years, depending on usage, and both must be replaced at the factory. The parts in the Accessory Kit (listed below) are field replaceable by the user.

- The following parts are included with the FTM Accessory Kit (AZI# Y2600 0920):

Item Name	Item Part Number	
1/8" x 3/16" Reducer	1300 0031	These four items are pre-assembled into the Tubing Assembly at the factory.
Tubing Adaptor	1400 3010	
1' of 1/8" Tygon® tubing	345-0050	
1' of 3/16” Tygon® tubing	2500 3010	
Barbed Desiccant Fill cap	2600 3010	
1 Lb. Desiccant	2600 3055	
(2) Guide pins	2800 2044	
115 VAC Line Cord	6000 4003	
5/64” Allen wrench	2300 0003	

- The following spare parts are also available:

Item Name	Item Part Number
1 Amp Fuse	5100 1012
(one spare fuse is included in the line cord receptacle)	
Centering Plate	300-0968
Vacuum Cap, Red	PS-366

To order any of the above parts, return the FTM for factory calibration, or for permeation tube or filter replacement, call AZI Customer Service at 800-528-7411 or 602-470-1414.

Note: The desiccant chamber in the Functional Test Module is quite small and is not suitable for extended operating periods in areas of high humidity. The Barbed Desiccant Fill cap included with the Accessory Kit may be useful in extremely humid environments. To use, remove the standard desiccant fill cap from the FTM and replace it with the barbed version. Larger external desiccators or bottled "clean dry air" (at 0 PSI) may be connected to the module using the barbed desiccant fill cap. This is not typically necessary, and in most applications the standard desiccant and fill cap are adequate. Operating the Functional Test Module with depleted or no desiccant will not damage the FTM or the Jerome® Analyzer, but may cause erratic test results.

FUNCTIONAL TEST PROCEDURE

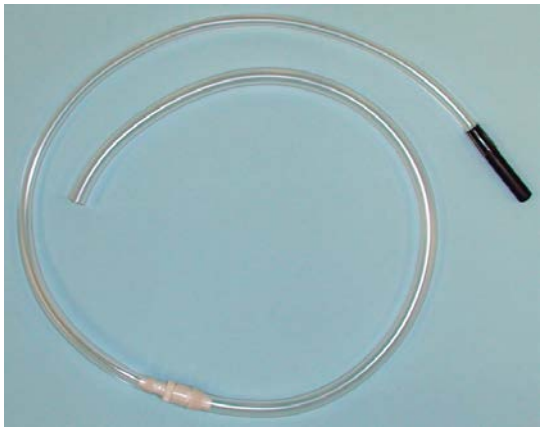
CAUTION: PERFORM THIS TEST IN A WELL-VENTILATED AREA AT NORMAL ROOM TEMPERATURE.

NOTE: THE LOW LEVEL FUNCTIONAL TEST MODULE (Z2600-0930) REQUIRES 6 HOURS FOR WARM-UP AND STABILIZATION. FOR BEST RESULTS, ALLOW THE FTM TO WARM-UP AND STABILIZE OVERNIGHT. ALWAYS KEEP THE TUBE ADAPTOR (OR SAMPLE GAS OUTLET) CAPPED WHEN THE FTM IS WARMING UP OR NOT IN USE. THE STANDARD LEVEL FTM (Z2600-0918) ONLY REQUIRES ONE HOUR OF WARM-UP.

NOTE: DO NOT STORE OR OPERATE THE FUNCTIONAL TEST MODULE AT TEMPERATURES EXCEEDING 120°F OR 49°C.

- Perform a Sensor Regeneration on the Jerome® 631-X or J605. (Refer to the Jerome® Analyzer's operator's manual for the procedure.)

- In a well-vented area, remove the red vacuum cap from the sample gas outlet of the FTM and firmly attach the open end of the tubing assembly to the sample gas outlet. Place the red vacuum cap on the exposed end of the tubing adaptor at the other end of the tubing assembly. USE CAUTION: A small amount of H_2S will escape.



Tubing Assembly

- Remove the desiccant fill cap and the foam plug. Do not remove the fritware (rigid white disk) at the bottom of the tube. Remove any spent desiccant that has turned from blue to pink. Refill with fresh indicating-type desiccant. Replace the foam plug and the cap.
  * If the barbed desiccant fill cap is being used, be sure it is not capped, and any connected gas source or external desiccator is properly set up.

- Attach the line cord to the Functional Test Module. Plug it into an 110VAC source and turn ON the power switch (located on the side of the FTM).

- Allow the FTM to warm-up and stabilize before proceeding.
  * Do not remove the cap from the tubing adapter. The scrubbed exhaust gas is vented out the exhaust port at the rear of the module.

- After the warm-up period, verify that the FTM's pump lamp is flickering rapidly, and that the heater lamp is blinking slowly or intermittently.
  * If either lamp is continuously off or on, the unit may not be operating correctly.
    ⇒ Temperatures below 10°C or above 30°C may cause this.
    ⇒ The air source, desiccator fill cap, or exhaust port on the back of the unit may be plugged.

- Remove the red vacuum cap and insert the tubing adaptor into the Jerome® Analyzer's intake, as shown. If using a 631-X, tighten the intake tube nut to ensure an airtight seal.

- Verify that the Jerome® 631-X or J605 is either in Auto-range mode or an appropriate manually selected range for the gas level being produced by the FTM. Refer to the 631-X or J605 Operation Manuals for additional information.

- Take and record 10 analyzer samples as follows.
  * Press SAMPLE on the Jerome® 631-X analyzer. On the J605, press ENTER/START or press the sample button at the end of the handle.
  * When the concentration reading appears, record it, wait 30 seconds, then take another sample.
  * Repeat this until a total of 10 samples have been taken and recorded.
  * The last page of this manual can be printed out and used to record the data.

- Disregard the first 5 samples and average the last 5.

ACCEPTABLE AVERAGE VALUE RANGES	
H_2S FTM (Z2600-0918)	0.200 TO 0.300 ppm H_2S
Low-Level H_2S FTM (Z2600-0930)	0.024 TO 0.036 ppm H_2S (24 TO 36 ppb H2S)

  * If the average is within the acceptable range, the Jerome® Analyzer is functioning properly.
  * If the average is NOT within the acceptable range, consider the following troubleshooting questions, make any necessary corrections and try again:
    ⇒ Were the functional test procedures followed exactly?
    ⇒ Is either the source or exhaust port plugged?
    ⇒ Did the FTM warm up and stabilize for the recommended time period?
    ⇒ Are all connections tight and proper?
    ⇒ Does your permeation tube need replacement?
      · How long has it been in use, and for how many hours?
    ⇒ Can you check the FTM H_2S output with another instrument?
      · Is it within range?
    ⇒ Do you suspect that your Jerome® Analyzer may be malfunctioning or is out of calibration?
      · Has it been calibrated at the factory in the last year?
  - Call AZI Customer Service, Toll Free (800) 528-7411, if you need help with any of the above, or if you need to return your FTM or Jerome® Analyzer for repair.

- Turn off the Functional Test Module.

- Remove the tube from the instrument's intake and cap the output tube adaptor (or the sample gas outlet if the Tygon® tube is removed) using the vacuum cap.
  * Unspent desiccant may be preserved by using the barbed desiccator fill cap and capping the barb.

* The desiccant can be regenerated in an oven @ 200°C (~400°F) until the desiccant returns to its blue color.

Store the FTM in a dry, well-ventilated area away from sources of ignition, heat, and oxidizing agents.

CALIBRATION

Arizona Instrument recommends annual factory calibration of the FTM. Please contact AZI's Customer Service department at 800-528-7411 or 602-470-1414 or by e-mail at support@azic.com for more information.

Visit AZI's web site at www.azic.com to request a Return Materials Authorization number and for a list of calibration prices.

Pre-shipping reminders:

- Remove the permeation tube assembly from the FTM prior to shipping.
- Package the permeation tube assembly back in the original plastic tube and metal shipping container.
- Return the permeation tube (in the metal shipping cylinder) along with the FTM when returning the FTM for factory calibration or repair.

WARRANTY

Seller warrants to buyer that products delivered pursuant to this Agreement shall, at the time of delivery, and for a period of one (1) year thereafter (the Internal Battery Pack, where applicable, is warranted for a period of ninety [90] days only), be free from defects in material or workmanship and shall conform to seller's specifications or such other specifications as seller has agreed to in writing. Seller's obligations with respect to claims under this warranty shall be limited, at seller's option, either to the replacement of defective or non-conforming product or to an appropriate credit for the purchase price thereof subject to the provisions of seller's Warranty Policy as amended from time to time, said Policy being incorporated herein by reference.

Return products under warranty claims will be shipped to seller's plant by buyer at buyer's expense and shall be accompanied by a statement of the reason for the return and an approved Return Material Authorization Number issued by seller. Buyer remains responsible for payment for products not accepted for warranty adjustment and freight and handling costs associated therewith.

Notwithstanding the foregoing, no warranty shall be enforceable in the event that product has been subjected to environmental or stress testing by buyer or any third party without written approval of seller prior to such testing. Further, no warranty shall be enforceable if the alleged defect is found to have occurred as a result of misuse, neglect, improper installation, repair, alteration, accident, or improper return handling procedure by buyer.

Discontinued product is warranted only for a credit or replacement at seller's option.

THE EXPRESS WARRANTIES GRANTED ABOVE SHALL EXTEND DIRECTLY TO BUYER AND NOT TO BUYER'S CUSTOMERS, AGENTS, OR REPRESENTATIVES AND, EXCEPT FOR WARRANTY OF TITLE, IS IN LIEU OF ALL OTHER WARRANTIES, WHETHER EXPRESSED OR IMPLIED, INCLUDING ANY IMPLIED WARRANTIES OF FITNESS FOR A PARTICULAR PURPOSE AND MERCHANTABILITY, SUCH OTHER WARRANTIES BEING SPECIFICALLY DISCLAIMED BY SELLER. IN NO EVENT SHALL EITHER PARTY'S LIABILITY FOR ANY BREACH OR ALLEGED BREACH OF THIS AGREEMENT EXCEED THE TOTAL EXTENDED PRICE OR PRICES SHOWN ON UNFILLED ORDERS, NOR SHALL EITHER PARTY BE LIABLE FOR ANY SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES RESULTING FROM BREACH OR ALLEGED BREACH.

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Arizona Instrument LLC
Jerome® H_2S Functional Test Module Operation Manual
Part Number 700-0095

If you have any questions regarding the operation of this instrument, please call our toll free number 800-528-7411. Internationally, call (602) 470-1414 or fax (480) 804-0656.

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FTM TEST FORM			
SETUP			
DATE:	MODEL:	S/N:	
WARM UP START TIME:		PUMP READY (flickering rapidly): Y / N	
SENSOR REGEN COMPLETED: Y / N		HEATER READY (blinking slowly): Y / N	
VERIFICATION			
TEST #1		TEST #2 (optional)	TEST #3 (optional)
Sample 1_____(discard) Sample 2_____(discard) Sample 3_____(discard) Sample 4_____(discard) Sample 5_____(discard) **Sample 6**_____ **Sample 7**_____ **Sample 8**_____ **Sample 9**_____ **Sample 10**_____		Sample 1_____(discard) Sample 2_____(discard) Sample 3_____(discard) Sample 4_____(discard) Sample 5_____(discard) **Sample 6**_____ **Sample 7**_____ **Sample 8**_____ **Sample 9**_____ **Sample 10**_____	Sample 1_____(discard) Sample 2_____(discard) Sample 3_____(discard) Sample 4_____(discard) Sample 5_____(discard) **Sample 6**_____ **Sample 7**_____ **Sample 8**_____ **Sample 9**_____ **Sample 10**_____
MEAN:_____PPM (average of samples 6-10)		MEAN:_____PPM (average of samples 6-10)	MEAN:_____PPM (average of samples 6-10)
FTM-930 .024 to .036ppm (24 to 36 ppb)	FTM-918 .200 to .300ppm	FTM-930 .024 to .036ppm (24 to 36 ppb)	FTM-918 .200 to .300ppm	FTM-930 .024 to .036ppm (24 to 36 ppb)	FTM-918 .200 to .300ppm
PASS	**FAIL**	**PASS**	**FAIL**	**PASS**	**FAIL**
TECHNICIAN:					