

**Model 501-A  
Model 501-A/BAT**

**Smoke Detector Tester  
for  
*Calibrated Sensitivity Inspection  
Of Installed Detectors***

**Meets Current NFPA 72-E  
Recommendations**

**For Calibrated  
Sensitivity Tests**

**For Ionization or  
Photoelectric Detectors  
(duct, wall or ceiling-mounted)**

**Adjustable Range:  
0.3 to 4.0 %/ft**



**UL Listed**

**Stable Smoke**

**Harmless to Detectors**

**30 Seconds Per Test**

**Portable, Easy to Operate**

***National Fire Alarm Code***

The National Fire Protection Association recommends periodic inspection and testing of smoke detectors at their installed locations as stated by the National Fire Alarm Code (NFPA 72-E, 1996 edition).

The test includes a calibrated sensitivity test to assure that (1) each detector is within its listed sensitivity range, and (2) each detector would initiate an alarm when exposed to smoke of certain concentrations.

***The Gemini 501-A & 501-B Testers***

The Gemini 501 Tester combines the above 2 objectives into a single and easy to perform test. The tester generates an adjustable amount of aerosol smoke between 0.3 and 4.0 %/ft obscuration to challenge the detector under test. During the test the operator selects a smoke concentration level and directs the smoke

through the hand held wands and shroud to the detector at the ceiling.

If the concentration selected is below the sensitivity setting of the detector, the detector would not alarm. However, if the concentration is equal to or greater than the setting, the detector should alarm within 30 seconds.

The minimum amount of smoke that triggers the alarm is the sensitivity setting of the detector.

***Aerosol Smoke***

The tester produces a consistent and stable smoke from a refined mineral oil. The smoke particle sizes and size distribution resemble that of smoke from the UL-268 Standard Smoke Box. Because of its small particle sizes, low concentration, and short exposure time, the test smoke is not harmful to the detectors or the operator.

## UL Listing and Calibration

Prior to its approval for listing, the Underwriters Laboratories (UL) evaluated to its satisfaction, the correlation of test results for detector sensitivity between the Gemini 501 Tester and the UL-268 Standard Smoke Box.

In production, each instrument is individually calibrated with a Particle Mass Monitor and Standard Reference Detectors. The instrument output is presented as mass concentration in  $\text{mg}/\text{m}^3$  and smoke obscuration in  $\%/ft$ .

## Model 501-A/BAT

This model includes a 12 V DC Sealed Lead-Acid Gel Cell Rechargeable battery for both battery or AC operation.

## Inspection Service

The Gemini Tester was designed with the inspection personnel in mind. It is a universal tester, suitable for all types and brands of detectors. Furthermore, it lets you test the detectors in place, without having to remove them from the ceiling.

Depending on the type of facilities, an experienced operator should be able to test 150 to 200 detectors per day.

## Maintenance

The only regular maintenance needed is to change the vacuum filter element after 200-300 tests. A pint bottle of Rudol Liquid, a refined mineral oil, is sufficient for over 800 tests.

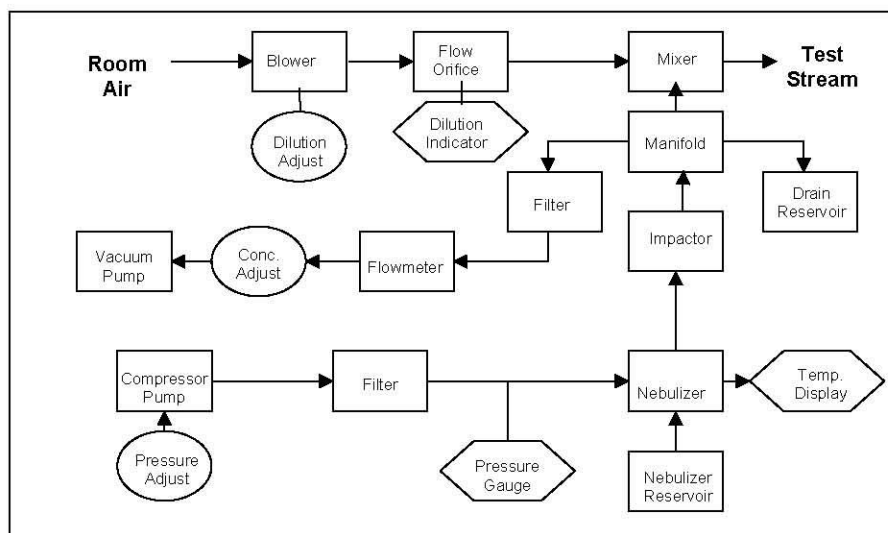


Figure 1. Schematic of the Gemini 501-A Tester

## Specifications

Aerosol Particle Size	
Number median diameter	0.2 micrometer ( $\mu\text{m}$ )
Mass median diameter	0.45 $\mu\text{m}$
Repeatability	$\pm 5\%$
Generation Characteristics	
Test stream flow rate	70 L/min
Aerosol flow rate	0 - 4 L/min
Concentration Range	0 - 45 $\text{mg}/\text{m}^3$ (0 - 4 $\%/ft$ obscuration)
Reset, concentration	$\pm 4\%$
Type of Aerosol	RUDOL oil*
Operating Temperature	24 $\pm 3$ $^{\circ}\text{C}$ (75 $\pm 5$ $^{\circ}\text{F}$ )
Mechanical Characteristics	
Dimensions, overall	16 x 11 x 10 in. (41 x 28 x 25 cm)
Weight, approximately	12 lb.(5.4 kg) 18 lb.(8.2 kg)with battery
Hose length	5 ft. (1.5 m)
Oil Reservoir Volume	approx. 30 ml
Power Requirement	
501-A, AC power	115 V AC, 60 Hz, 3A
501-A/BAT, AC or battery	12 V DC, 7 Amp-Hr Lead-Acid Battery

\*RUDOL oil, an NF-grade white mineral oil, aromatics-free, saturated aliphatic hydrocarbons. Viscosity = 29 centistoke @ 40  $^{\circ}\text{C}$ . Specific gravity = 0.87 @ 25  $^{\circ}\text{C}$ . It conforms to the FDA-CFR 172.878 which allows for direct skin & food contact and is stabilized with Vitamin E for long shelf life. RUDOL is a registered trade mark of Witco Chemical Corp.

## **GEMINI 501 ANALYZER FOR SMOKE DETECTORS**

*Why do so many companies choose the Gemini 501-A over other equipment for inspection and maintenance of smoke detector alarm systems?  
Here are the reasons:*

### **Gemini 501 is a UL-Listed Universal Tester**

- Other instruments may be able to test only ceiling-mounted detectors, but Gemini 501 Tester is a truly universal instrument that can test any type, brand, or model of smoke detectors which include **duct detectors, wall-mounted and ceiling-mounted** smoke detectors. Besides, it takes much **less time** to perform the test than any other instruments.
- No need to own a test probe from every manufacturer.

### **Gemini 501 uses a Calibrated Sensitivity Test Method**

- It uses a known and adjustable concentration of aerosol smoke for the test.
- It uses smoke with particles sizes comparable to the UL-268 Standard<sup>1</sup>.
- It uses the up-to-date testing method recommended by the NFPA 72 National Fire Alarm Code (1996 ed.)<sup>2</sup>.

### **Gemini 501 tests All the Functional Parts of the Detector**

- It measures the sensitivity (alarm point) of the whole alarm circuit.
- It checks blockage to smoke entrance.

### **Gemini 501 is Portable, Reliable, and Easy to Use**

- Operator directs the smoke through a hose, wand, and cup to the detector at the ceiling. Tests take about 30 seconds and are *harmless* to the detector.
- The accuracy of the instrument is maintained by working reference standards traceable to the UL-268 Smoke Box.

About 3% of the installed detectors failed as the results of sensitivity shift, which is beyond the UL acceptable limits. The statistic is based on Fire Department inspections of over 10,000 detectors in 4 cities.

Now, Many states have adopted inspection procedures for critical facilities using calibrated sensitivity tests recommended by the current (1996) NFPA 72 National Fire Alarm Code.

<sup>1</sup> Underwriters Laboratories

<sup>2</sup> National Fire Protection Association

<sup>3</sup> Federal Emergency Management Agency 1982 Survey Report



### Carry Case for Gemini 501-A & 501-A/BAT ONLY

Put Detector Analyzer, Hose, Wand, Shroud, and accessories in a single carrying case. Foam interior for snug-fit protection of the Instrument.

Constructed of light-weight, tough, wear-resistance fiberbilt material, aluminum tongue and groove closure with stell reinforced corners.

Size .....22"x16"x10"

Color..... Gray



### Carry Case for Gemini 501-B (can be used for 501-A & 501-A/BAT also)

Put Detector Analyzer, Hose, Wand, Shroud, and accessories in a single carrying case. Foam interior for snug-fit protection of the Instrument. The case is watertight, airtight, dustproof, crushproof, and built tough! It is equipped with 2" hard rubber transport wheels and a retractable extension handle. Features include multiple fold down carrying handles, atmospheric pressure purge valve, integral wheels and comfort grip.

Inside Dimensions .....22 3/16" L x 17 1/8" W x 10 9/16" D

Outside Dimensions.....24 9/16" L x 19 5/16" W x 11 15/16" D

Color.....Black



### Fold-up Instrument Carrier (Heavy Duty) for 501-A & 501-A/BAT ONLY

Constructed of stell and particle board.

Unfolded Size .....24"x16"x29" H

Folded Size .....24"x10"x38" H

Load Capacity .....170 LB.

Wheels(2) .....10"

Casters(2).....4" swivel with lock

Weight .....40 LB.



### Fold-up Instrument Carrier (Light Duty)

Constructed of durable white-paint steel

Unfolded Size .....24"x16"x29" H

Folded Size .....24" x 3"x36" H

Casters(4).....3" swivel, no lock

Weight .....12 LB.



**Partial List of Typical Users  
of  
Gemini 501 Analyzer for Smoke Detectors**

***Smoke Detector Manufacturers***

ADT Security Systems, Spokane, WA  
System Sensor, St. Charles, IL  
Cerberus Pyrotronics, Columbus, OH  
Simplex Time Recorder Co., Gardner, MA  
Johnson Controls, Milwaukee, WI

***Government Agencies***

Center for Fire Research, Gaithersb., MD<sup>1</sup>  
Florida Dept. of Correction, Zephyr, FL  
Malmstrom Air Force Base, MT  
Navy Public Work Cntr., Great Lake, IL  
Omaha Public School, Omaha, NE  
Michigan Dept. of Correction, Ionia, MI

***Veterans Administration Medical Ctns.***

Most VA Hospitals Including:  
V A Hospital, Altona, PA  
V A Hospital, Augusta, GA  
V A Hospital, Omaha, NE  
V A Hospital, St. Louis, MO  
V A Hospital, Charleston, SC

***Hospitals***

Kaiser Medical Center, Portland, OR  
Christ Hospital, Oak Lawn, IL  
Rhode Island Hosp., Providence, RI  
N. C. Baptist Hospital, Winston, NC  
Humana Women's Hospital, Tampa, FL

***Universities***

Univ. of Wisconsin, Madison, WI  
Oklahoma State, Stillwater, OK  
Florida State Univ., Tallahassee, FL  
Univ. of California, Davis, CA  
Purdue Univ. West Lafayette, IN

***Installation & Inspection Services***

Fire Master, Phoenix, AZ  
Honeywell, Inc., Salt Lake City, UT  
Edwards Co., Lakewood, CO  
Koorsen Protective Services, Fort Wyne, IN  
Landis & Straefa, Roanoke, VA  
Grinnell Fire Protection, Cincinnati, OH

***Industries***

Security Link, Orlando, FL  
The Boeing Co., Seattle, WA  
A T & T, New York, NY  
Arco Alaska Oil, Anchorage, AK  
Penn. Power & Light, Berwick, PA  
Walt Disney World, Lake Buena Vista, FL

W I T H U S

대전광역시 대덕구 대화동 289-1  
산업용재유통단지 11동 112호

TEL : 042)6 7 0 - 7 8 4 0

FAX : 042)6 7 0 - 7 8 4 8