# LASER PHOTOMETER
# MODEL 8587A

A COMPACT, RELIABLE PHOTOMETER
FOR CUSTOMIZED FILTER TESTING.

This photometer features a reliable laser diode that produces constant laser power, so aerosol concentration measurements remain stable over a long period of time. A sheath-air design keeps the optics clean for low background levels and also minimizes maintenance requirements. The 8587A utilizes an internal switching valve to measure both the upstream and downstream aerosol concentration. A special high-speed "purge" mode shortens the purge time when switching between upstream and downstream measurements.

A simple command set can be incorporated into your LabVIEW® program to give you complete flexibility in test protocol and database management. All of these features combine to make the 8587A ideally suited for custom filter testing applications.

**Applications**

+ Respirator certification testing (fit testing)
+ Efficiency testing of HEPA filter assemblies
+ Respirator design and development
+ Filter design and development
+ Aerosol laboratory research

**Features and Benefits**

+ Same photometer engine as used by NIOSH
+ Filter-efficiency measurements to 99.999%
+ Penetration versus particle size to 0.001%
+ Fit factors to 100,000
+ Indicates low airflow conditions
+ Signal correlates with aerosol mass concentration
+ Stable 30 mW laser light source
+ Internal valve switches between upstream and downstream samples
+ Automatic gain selection
+ Analog and digital output
+ Manual or remote control via RS-232 or USB
+ Critical orifice controls sample airflow
+ Plug-and-play compatibility with the original 8587 command language

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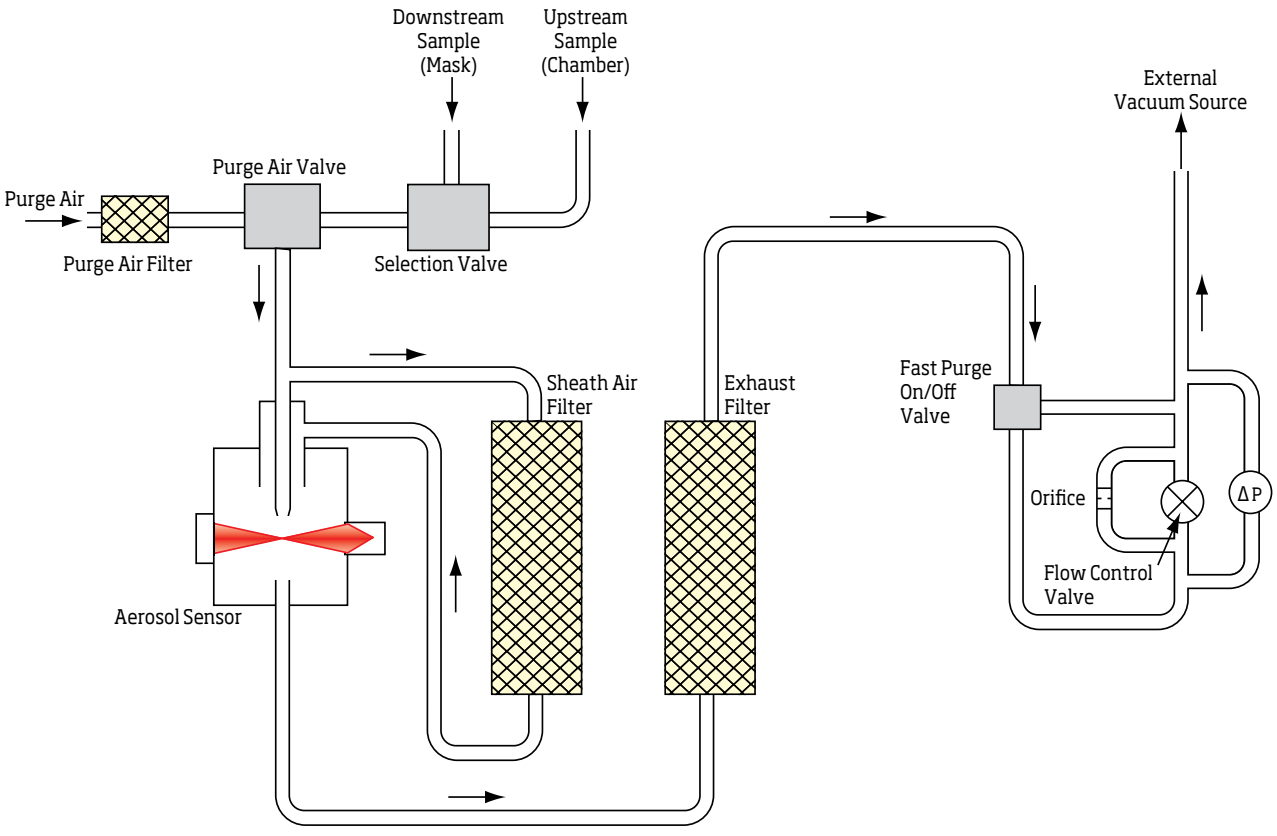
**Background**

In 1990, TSI began developing an advanced-technology light scattering photometer to replace aging instruments incapable of measuring the high protection factors provided by newer gas mask designs. The result was the Laser Photometer 8587A, which is still in service for testing filter efficiency.

Moreover the photometer owners asked TSI to develop a modern version of the Laser Photometer 8587 that retains data continuity with the original version. Without data continuity, vast amounts of legacy research would not be directly comparable to new research.

The Model 8587A can also be used in HEPA filter scanning systems to measure the penetration efficiencies of large, high-efficiency filter assemblies.

## Flow Schematic Model 8587A Laser Photometer



**Respirator Certification Testing**

The Laser Photometer Model 8587A uses the same reliable, robust, time-proven photometer engine as the original Model 8587 used by the US Army for gas mask development and by NIOSH for CBRN respirator certification testing. In fact, the 8587A is plug-and-play compatible with the original 8587. This means your laboratory can develop and test new respirator designs using the same measurement used for NIOSH certification testing.

**Operation**

The Model 8587A has a simple front panel keypad for manually switching between upstream sampling, purging and downstream sampling. It also has a digital photometer voltage display on the front panel, with the real-time analog voltage available via a back panel connector.

Most users will want to take advantage of the remote control features that allow precise test protocol control via an RS-232 or USB 1.1 interface. You can write your own software to control all aspects of testing, including sampling mode (i.e., upstream/purge/downstream), read voltage, reset voltage, query valve status, and to control all three valves individually. Example program code is included to help programmers get started using the simple ASCII command set.

**Low Maintenance**

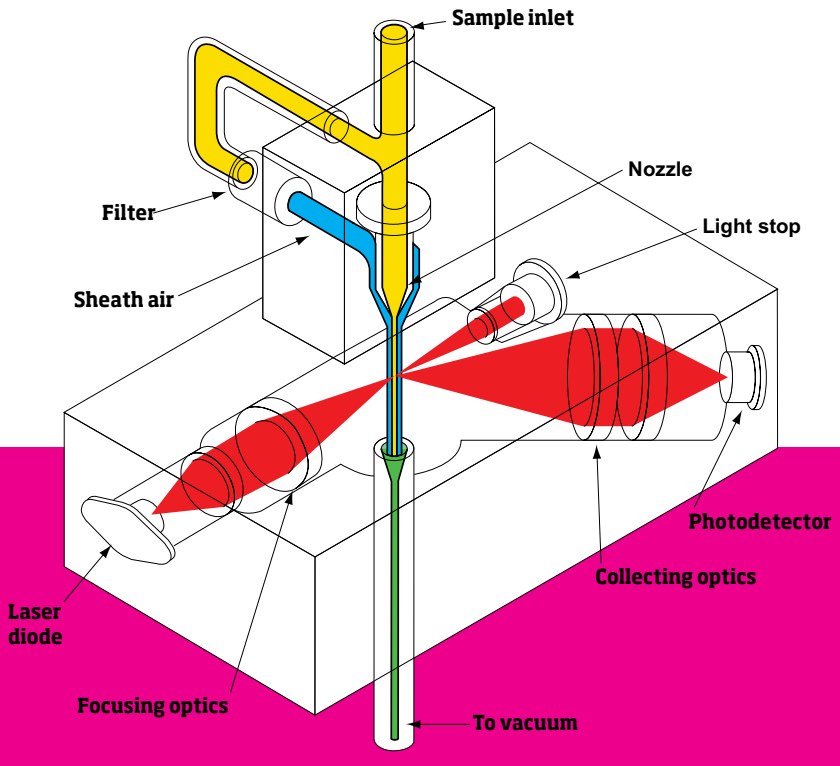
The optics are protected by filtered sheath air. Aerosols never come in contact with the lenses.

**Filter Testing**

The Model 8587A is perfect for testing the efficiency of particulate filters. In fact, the 8587A photometer engine is the same one used in the TSI Automated Filter Tester Model 8130 currently employed by NIOSH for 42CFR part 84 particulate filter certification. Integrated valves make switching between upstream, purge and downstream measurements simple using front panel or remote control.

**Laboratory Applications**

The 8587A is useful for a variety of aerosol research applications. It is a basic photometer with switching valves added to accommodate easy aerosol concentration ratio measurements or mass correlations with a wide variety of aerosols.



# SPECIFICATIONS

## LASER PHOTOMETER
## MODEL 8587A

**Photometer**

| | |
|---|---|
| Concentration Range | 1.0 µg/m³ to >200 mg/m³ (0.000001 to 0.200 g/m³) |
| Dynamic Range | Fit factors to 100,000; filter efficiency to 99.999 percent |
| Gain Selection | Automatic |

**Optics and Laser**

| | |
|---|---|
| Light Source | 30 mW laser diode, 780 nm wavelength |
| Collection Angle | 45 degrees |
| Lens Protection | Sheath air prevents aerosol from contacting optics |

**Flow Rate**

| | |
|---|---|
| Sample | 2.0 l/min (controlled with critical orifice) |
| Purge | Approx. 20 l/min (uncontrolled) |

**Instrument Control**

| | |
|---|---|
| Manual | Front panel buttons |
| Remote | Computer control via RS-232 or USB 1.1 |

**Size (W x H x D)**
15 cm x 25 cm x 33 cm (6.25 in. x 10 in. x 13 in.)

**Weight**
6.4 kg (13.5 lb)

**Vacuum Pump***

| | |
|---|---|
| Sampling | 2.0 l/min @ 55 kPa (8 psi) vacuum |
| Purging | 20 l/min @ 0 kPa (ambient atmospheric pressure) |

**Communications**

| | |
|---|---|
| Analog Output | 0 to 5 VDC |
| RS-232 | 9-pin D-type (DB9F) connector; ASCII; 1200 bps or 115 Kbps (selectable), N, 8, 1 |
| USB | USB 2.0, 12 Mbps, type B female connector |

**Power**
100 to 240 VAC, 50/60 Hz (auto-sensing), 1.3 A, IEC 60320/C14 socket

**Front Panel**

| | |
|---|---|
| Display | 16 character x 2 line LCD (backlit) |
| Control Buttons | Upstream, Purge, Downstream |

**Back Panel**
On/Off switch
IEC 60320/C14 line cord socket
Analog output female BNC connector
RS-232 connector (DB9F)
USB Type B female connector
6.4 mm (0.25 in.) diameter upstream/downstream/vacuum ports

**Software Provided**
Documentation of 8587A ASCII command set (in Operation and Service Manual), 8587A USB driver software for Windows® XP/2000 operating system, USB terminal emulation software for interactive control via USB port, C++ USB function library

*Purge flow is the determining factor in selecting a vacuum pump. Most pumps that provide the needed purge flow at atmospheric pressure will have no difficulty providing the needed flow during sampling.



## TO ORDER

**Model 8587A Laser Photometer**

| Specify | Description |
|---|---|
| 8587A | Laser Photometer, 115/230 VAC, 60/50 Hz |
| 2610110 | Vacuum pump for one photometer, 31 L/min max, 115 VAC, 60 Hz |
| 1500135 | Vacuum pump for one photometer, 25 L/min max, 230 VAC, 50 Hz |
| 3033 | Vacuum pump for two to four photometers, Up-to 60 l/min, 115/230 VAC, 60/50 Hz |
| 4140 | Airflow meter to verify supply and sample airflows |
| 1980538 | Model 8587A Laser Photometer manual |
| 1083636 | Filter maintenance kit for 8587A |

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**TSI Incorporated** - Visit our website **www.tsi.com** for more information.

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