Data Sheet

SERIES 1120 FLOW / VOLUME SIMULATOR
Generate Spirometry, Peak Flow Meter and Breathing Waveforms

Product Description

The Series 1120 Flow/Volume Simulator is a servo motor driven piston pump that is used for testing spirometers, peak flow meters and other respiratory devices. It is specifically designed for use in testing labs, product development and manufacturing test applications.

THREE modes of operation:

1. Waveform Mode used for testing spirometry and peak flow meter devices using the standard ATS/ERS and ISO waveforms. Also custom waveforms can be generated and used for testing.
2. Steady Flow Mode used for generating steady state flows over a wide range of flow rates covering the capabilities of respiratory devices. This mode can be used to test and calibrate flow meters.
3. Breathing Waveform Mode used to produce a continuous inhale/exhale flow waveforms that simulate breathing.

All modes provide graphs for flow and pressure signals. Data collected during testing can be saved for post analysis.

Product Features

- Produces all the ATS/ERS and ISO Spirometry Standards Waveforms and the ISO Peak Flow Meter Standard Waveforms
- Modes for spirometry, steady state flow and continuous breathing waveforms
- Utilities for generating user defined waveforms
- Graphic display of flow and pressure signals
- Save data files for post analysis
- Scripting capabilities and serial commands for automation and integration into manufacturing
- Built-in pressure sensor for measuring flow with optional pneumotach flow meter
- Barometric and Cylinder pressure sensors for correcting flow due to compression
- Flow capability to 16 L/sec
- Volume capability to 8.5 Liters
- Optional heat and humidification for BTPS testing
- 115 or 230 VAC 50-60 Hz power required
- Bench top size, 36 inches (91.5 cm) length X 14 inches (35.5 cm) width X 7 inches (18 cm) height

Pressure Sensors

1. Barometric and Cylinder integrated pressure sensors measure the barometric and cylinder pressure during each test. The pressure data is used to correct the calculated flow for gas compression in the cylinder.
2. Differential pressure sensor with connections on front panel near device under test can be used for measuring flow resistance of a device connected to the simulator.

Sequence Files

Text files that are used to provide a means to automate the simulator functions for testing.

Serial Connection

Can be used to send commands and retrieve data from another program. This is useful when integrating the simulator in a manufacturing or production testing system.

Flow and Pressure Graphs

Two graphs display flow and pressure data that is collected with each test.

1. Flow graph can display the calculated flow based on the piston position , measured flow from a pneumotach and the target flow from the desired waveform.
2. Pressure graph can display the cylinder pressure and auxiliary pressure signals.
3. Both Flow and Pressure graphs can be dynamically scaled and panned to allow the user to zoom in and view specific sections of the waveforms or to view the complete waveform. Printouts of the graphs can be made.



Series 1120 Flow / Volume Simulater

Spirometry Testing

In the exhale waveform mode the FV Simulator will generate all of the ATS/ERS and ISO waveforms for testing spirometry devices.

- Custom waveforms can be created using supplied utilities
- Waveforms can be scaled up or down to adjust for different flows and volumes
- Different starting positions of the internal piston allow you to change the internal volume used during a waveform test

Peak Flow Meter Testing

The waveforms defined by ISO 23747 for testing peak flow meters are included for testing these devices.

- This simulator has been tested by Physikalisch-Technische Bundesanstalt (PTB) in Berlin and certified for use in testing peak flow meters. PTB is the German national metrology institute providing scientific and technical services.

Stead Flow

The stead flow mode can be used to check the calibration of a flow meter or provide a constant flow for spirometer calibration.

- Volume delivered can be adjusted up to 8.5 liters
- Flow rate can be set from 0.0167 to 16 liter per second.
- Select either inhale or exhale flow direction
- Pressure and Flow data collected during the test is displayed on the graphs

Breathing Waveform

A breathing waveform can be created using the supplied utilities and then used to create a simulated breathing flow pattern.

- Amplitude and breath rate are adjustable so you can simulate different breathing with the same waveform file.
- The breathing waveform can be run once or repeated continuously

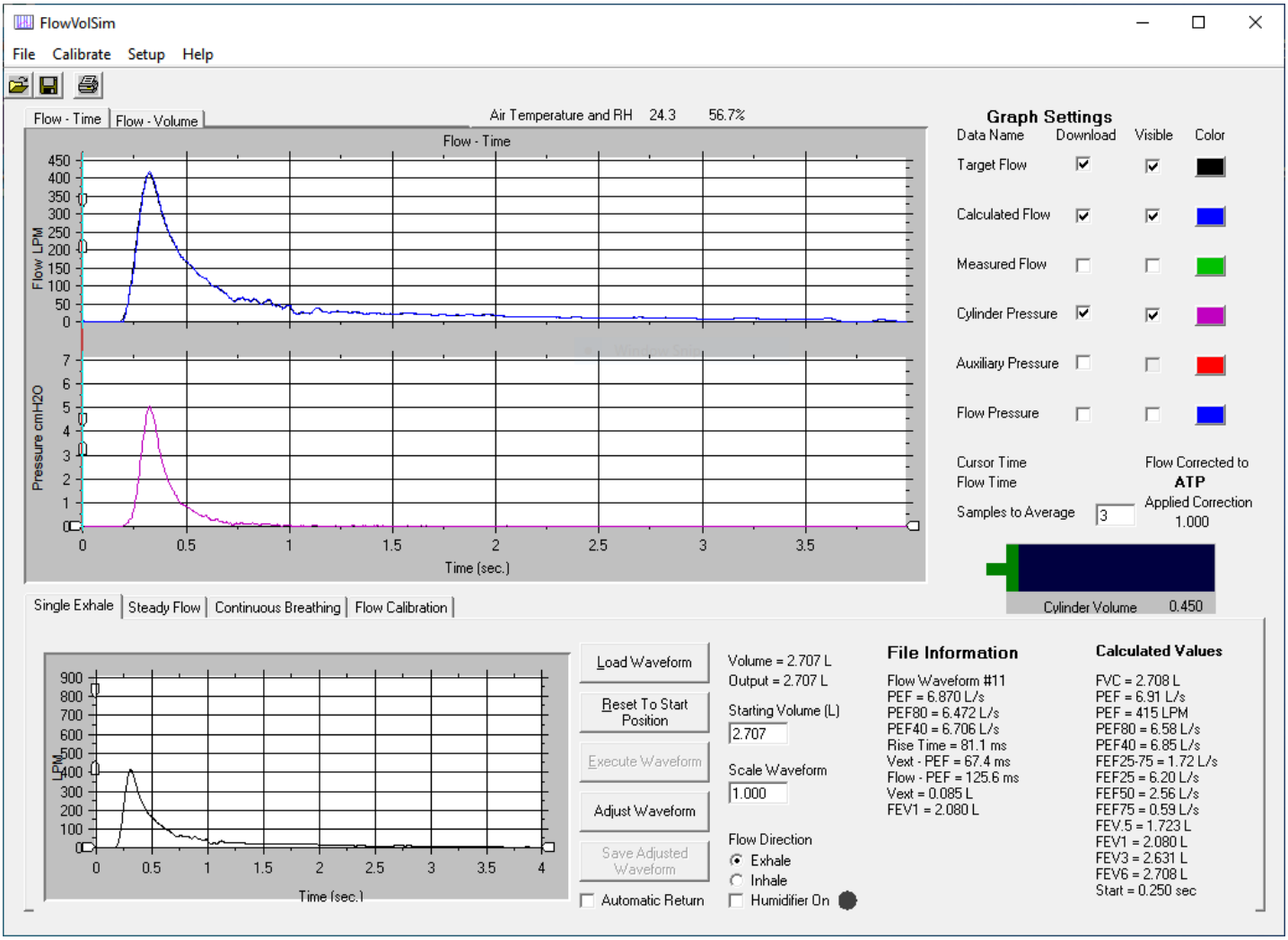
Options & Accessories

- **Heated Air –** used to heat the air in the cylinder to simulate actual exhaled air temperature for BTPS spirometry testing
- **Humidification system –** used to humidify the inhaled air to better simulate actual exhaled air conditions for BTPS spirometry testing. The Heated Air option must be ordered when ordering the Humidification system.
- **Pneumotachs –** heated or non-heated pneumotachs can be integrated for measuring outlet flow. The pressure sensor required for the pneumotach is included in the base system. If the heated pneumotach is ordered then the heater control for the unit is added to the Simulator.
- **Computer –** required for operation is not included with the base system and needs to be order separately or supplied by the customer. A computer with USB port and Window 7 or 10 operating system is required. We sell a lap top with the Simulator software installed.

References

ATS/ERS Task Force: Standardisation of Lung Function Testing, 2005
ISO 26782:2009, Anaesthetic and respiratory equipment – Spirometers intended for the measurement of time forced expired volumes in humans
ISO 23747:2015, Anaesthetic and respiratory equipment – Peak expiratory flow meters for the assessment of pulmonary function in spontaneously breathing humans

Ordering Information	
Part Number	**Description**
113266	Series 1120 Flow Volume Simulator (base system)
113274	Computer (lap top) for FVS
DR1168A	Heated Air, Cylinder Heater & Control
DR1168B	Humidification System
201424	Non Heated Pneumotach, 112192-4813 and Connector 200125
201450	HeatedPneumotach,112947-3813,Connector200125andHeaterControl
201488	TransitCasewithFoamlining,Handle&Wheelsforshippingandtransport
DR1299	RUDOLPHprovideSpirometerTestingpertheATS/ERS/ISOstandards



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