



Knowledge Beyond Measure.

# Certifier™ Flow Analyzer Test Systems

Handheld Instruments for Gas Flow Analysis



**Worldwide use in hospitals, home-care, laboratories, and manufacturing**

## TSI® Certifier™ Gas Flow Analyzers

The trusted tool for biomedical testing professionals to efficiency test and service medical equipment. Certifiers utilize TSI® flow sensing technology which is optimized for medical applications where accuracy and reliability are key requirements.

The unique modular design of these handheld flow analyzers enables purchasing flexibility, lower service costs, and increased testing "up time" for customers.

### Test parameter measurement

TSI® Certifier™ Flow Analyzers can measure a wide range of biomedical test parameters:

- Gas flow
- Gas volume
- Gas pressures  
(barometric and/or breathing circuit)
- Gas temperature
- Gas concentration (oxygen)
- Breathing parameters

## Users and applications

Technicians, engineers, designers, researchers, and scientists use TSI Certifier™ Flow Analyzers in applications such as:

- Maintenance and field service
- Engineering product development
- Manufacturing and quality assurance
- Research

## Medical equipment testing

TSI Certifier™ Gas Flow Analyzers offer the flexibility to test a wide range of medical equipment including:

- Mechanical ventilators
- Anesthesia machines
- Air oxygen blenders
- Insufflators
- Oxygen concentrators
- Positive air pressure devices



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## Model 4080-S Certifier Plus

Gas Calibrations	Air, O <sub>2</sub> , Air/O <sub>2</sub> mixtures, N <sub>2</sub> , CO <sub>2</sub> , N <sub>2</sub> O
Flow Direction	Bi-directional (4081 high flow module)
Gas Conditions	STP, ATP, BTPS, BTPD, plus user-defined
Max Breath Rate	1500 BPM
Pressure Measurements	Low, High, Barometric
Dual Flow Module Capability	Yes
Display	5-inch color touchscreen Display up to 18 test parameters
User Configurations	Save, load, and transfer test setups
Batteries	Li-Ion Rechargeable 8 hours of continuous operation
AC adapter	Yes
Data Acquisition	Save measurement data and screen captures to internal memory, USB export
Computer Interface	USB from the 4089 Interface Module

## Certifier™ Plus Flow Analyzer Test System

THE NEW CERTIFIER™ PLUS FLOW ANALYZER is a full-featured system capable of testing virtually all models of ventilators: adult, pediatric, anesthesia, neonatal and high-frequency, as well as a variety of other medical equipment. This multi-functional pneumatic test system can measure 28 different test parameters and graph data in real-time. It's easy operation, rugged design, and mounting options make the Certifier™ Plus Flow Analyzer ideal for use in field service, biomedical shops, and manufacturing.

### Test Parameters

- Flow rate, peak flow, and minimum flow
- Volume (inhaled and exhaled)
- Minute volume
- Low pressure (differential)
- Peak, PEEP, and plateau pressures
- Mean and minimum airway pressures
- High pressure
- Barometric pressure
- Static compliance
- Inspiratory, inspiratory pause, and inspiratory rise times
- Expiratory times
- I:E ratios
- Respiratory rate
- Gas temperature
- Oxygen concentration (with optional 4073 kit)





### Certifier Flow Analyzer Test System

THE CERTIFIER™ FLOW ANALYZER is a low-cost test system capable of testing multiple parameters of ventilator performance. The model 4070 Certifier delivers high performance measurements in a simple design that is easy to setup and operate. The entire kit weighs less than 3 lbs (1.4kg) and yet is durable enough to withstand biomedical test environments. Its compact size, battery operation, and high value make the model 4070 Certifier flow analyzer ideal for use in field service, biomedical shops, and manufacturing environments where simplicity and affordability are important.

#### Test Parameters

- Flow rate, peak flow
- Volume (inhaled)
- Minute volume
- Stacked volume
- Low pressure
- Peak and PEEP pressures
- Barometric pressure
- Inspiratory time
- I:E ratio
- Respiratory rate
- Oxygen concentration (with optional 4073 kit)



### Model 4070 Certifier FA

Gas Calibrations	Air, O <sub>2</sub> , Air/O <sub>2</sub> mixtures, N <sub>2</sub> O
Flow Direction	Uni-directional
Gas Conditions	STP, ATP, BTPS
Max Breath Rate	120 BPM
Pressure Measurements	Low, High, Barometric
Display	Fixed segment LCD Displays 2 test parameters
Batteries	4 – AA alkaline batteries
AC adapter	–
Data Acquisition	–
Computer Interface	–



## Specifications

# Certifier™ Plus and Certifier™ FA Test Systems

### Models 4080-S, 4080-F

Measurements	Gas/Mode	Range	Accuracy**
Flow Rate – High Flow	Air, O <sub>2</sub>	-200 to +300 slpm*	± 2% or 0.075 slpm
	Air/O <sub>2</sub> mixtures	0 to 300 slpm	± 3% or 0.1 slpm
	N <sub>2</sub>	-200 to +300 slpm	± 3% or 0.1 slpm
	CO <sub>2</sub>	-40 to +40 slpm	± 3% or 0.1 slpm
Flow Rate – Low Flow	Air, O <sub>2</sub>	0.01 to 20 slpm	± 2% and 0.008 slpm
	N <sub>2</sub> , CO <sub>2</sub>	0.01 to 20 slpm	± 3% and 0.010 slpm
	N <sub>2</sub> O	0.01 to 20 slpm	± 4% and 0.025 slpm
	Air, O <sub>2</sub>	0.01 to 10 std liters	± 2% and 0.02 liters
Inhaled Volume – High Flow	Air/O <sub>2</sub> mixtures	0.01 to 10 std liters	± 4% and 0.02 liters
Exhaled Volume – High Flow	Air, O <sub>2</sub>	0.01 to 10 std liters	± 3% and 0.03 liters
	Air/O <sub>2</sub> mixtures	0.01 to 10 std liters	± 4% and 0.04 liters
Inhaled Volume – Low Flow	Air, O <sub>2</sub>	1 to 100 std mL	± 2% or 2 mL
	N <sub>2</sub> O	1 to 100 std mL	± 4% or 2 mL
Minute Volume	MV	0.01 to 100 std liters	± 3%
Low Pressure	PIP, PEEP, P <sub>MAP</sub> , P <sub>MIN</sub> , P <sub>A</sub> , P <sub>PLAT</sub>	-25 to +150 cm H <sub>2</sub> O	± 0.5% or 0.15 cm H <sub>2</sub> O
High Pressure	P <sub>High</sub>	-10 to +150 psi	± 1% or 0.1 psi
Barometric Pressure	P <sub>ABS</sub>	7 to 23 psi	± 0.16% psi (11 mbar)
Respiratory Times	t <sub>I</sub> , t <sub>P</sub> , t <sub>I+P</sub> , t <sub>E</sub> , t <sub>R</sub>	0.04 to 30 secs	± 2% or 0.01 secs
I:E Ratios	I:E, I:E <sub>I+P</sub>	1:100 to 100:1	± 4%
Respiratory Rate	f	1 to 1500 bpm	± 2% or 0.01 bpm
Static Compliance	C <sub>STAT</sub>	0.01 to 1000 mBar/mL	± 3% or 1 mbar/mL
Oxygen Concentration	O <sub>2</sub> %	21% to 100%	± 2%
Temperature	T	5 to 40°C	± 1°C at flow rates above 2 L/min

### Model 4070

Measurements	Gas/Mode	Range	Accuracy**
Flow Rate – High Flow	Air, O <sub>2</sub>	0 to 300 slpm*	± 2% or 0.075 slpm
	Air/O <sub>2</sub> mixtures	0 to 300 slpm	± 3% or 0.1 slpm
Flow Rate – Low Flow	Air, O <sub>2</sub>	0.01 to 20 slpm	± 2% or 0.01 slpm
	N <sub>2</sub> O	0.01 to 15 slpm	± 4% or 0.025 slpm
Inhaled Volume – High Flow	Air, O <sub>2</sub>	0.01 to 10 std liters	± 2% and 0.02 liters
	Air/O <sub>2</sub> mixtures	0.01 to 10 std liters	± 4% and 0.02 liters
Inhaled Volume – Low Flow	Air, O <sub>2</sub>	0.01 to 10 std liters	± 2% or 0.01 liters
	N <sub>2</sub> O	0.01 to 10 std liters	± 4% or 0.01 liters
Minute Volume	-	0.01 to 99 std liters	± 7%
Low Pressure	-	-25 to +150 cm H <sub>2</sub> O	± 0.75% or 0.2 cm H <sub>2</sub> O
Barometric Pressure	-	7 to 29 psi (500 to 2000 mbar)	± 0.16 psi (11 mbar)
Inspiratory Time	-	0.25 to 60 secs	± 0.01 secs
I:E Ratio	-	1:100 to 100:1	± 5%
Respiratory Rate	-	0.5 to 120 bpm	± 5%
Oxygen Concentration	-	21% to 100%	± 2%

\* slpm = Standard Liters per Minute

\*\* Accuracy stated as percent of reading at TSI standard gas conditions  
See operator's manual for more complete specifications

## Ordering Information

### Ventilator Test Systems

Model 4080-S: Certifier™ Plus High Flow, Standard Kit (4089 + 4081)

Model 4080-F: Certifier™ Plus High Flow, Full Kit (4089 + 4081 + 4073)

Model 4070: Certifier™ FA High Flow, Standard Kit (4078 + 4071)

### Anesthesia Machine Testing

Certifier Plus System: Model 4082 Low Flow (works with 4089 Interface)

Certifier FA System: Model 4072 Low Flow (works with 4078 Interface)

### Accessories

Model 4073: Oxygen Sensor Kit (works with both 4070 and 4080 models)

PN 130398: Mounting kit for Certifier Plus Interface Module

PN 130399: Mounting kit for Certifier Plus Interface + Flow Module

PN 130396: Adult Test Lung, 1L

PN 130397: Pediatric Test Lung, 0.5L

PN 130391: Certifier Plus connector kit

PN 130370: Stylus, capacitive touch

PN 130384: Flow module cable, 4089

PN 130379: RS232 cable, 4089

PN 130395: Flow resistor kit

Specifications are subject to change without notice.

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