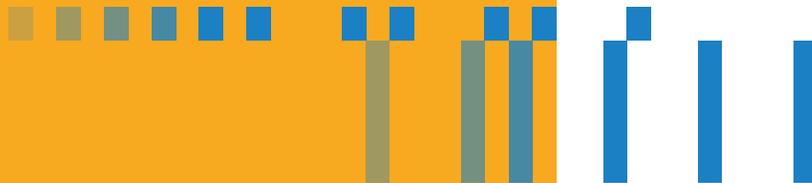**TSI**

® Knowledge
Beyond
Measure.

Testing Biomedical Equipment Has Never Been Easier

Certifier™ Plus Flow Analyzer
Handheld Test System for Gas Flow Analysis

Testing Biomedical Equipment Has Never Been Easier

Certifier flow analyzers are the go-to tool for biomedical professionals to efficiency test and service respiratory medical equipment. Certifiers utilize TSI® flow sensing technology which is optimized for medical applications where accuracy and reliability are key requirements.

Portable and Easy to Operate
- Compact and lightweight design
- Color touchscreen display
- Simple user interface with easy data viewing
- Up to 8 hours of continuous battery operation

Faster Test Setups and Reporting
- User configurations to save or recall past test setups
- Transfer configurations between Certifier Plus instruments
- Automatic breath detection, don't need to set manual triggers
- Snapshot features saves screen capture along with data displayed
- Easy export via the USB port

Benefits of Unique Modular Design
The Certifier Plus is a modular test system with the interface display separated from the measurement by coiled cable. This design enables customer benefits such as purchasing flexibility (purchase as a system or in pieces), lower service costs, and increased testing "up time".

Test Parameter Measurements
The Certifier™ Plus Flow Analyzer can measure 28 different test parameters:
- Gas flows
- Gas volumes
- Gas pressures (barometric and/or breathing circuit)
- Gas temperature
- Breathing parameters
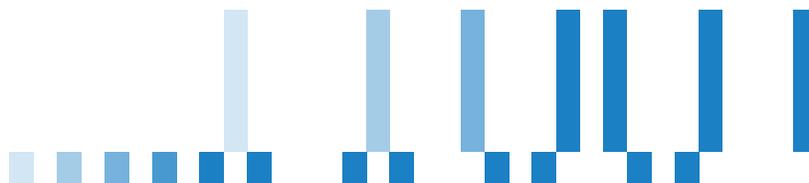- Oxygen concentration

Full-featured Test System
The Certifier™ Plus Flow Analyzer is able to test a wide range of respiratory medical equipment including:
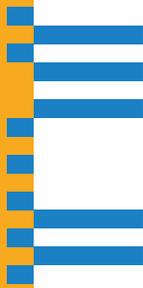- Mechanical ventilators
- Anesthesia machines
- Air oxygen blenders
- Insufflators
- Oxygen concentrators
- Positive air pressure devices

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

Modular System Design

- Components include 4089 Interface Module, 4081 High Flow Module, and 4082 Low Flow Module
- Test systems (4080-S and 4080-F) include a 4089 interface module and 4081 high flow module
- Purchase modules individually or as part of a test system
- All modules and systems are kitted with accessories

Certifier™ Plus Flow Analyzer Test System

The Certifier Plus flow analyzer is a full-featured test system capable of testing a wide range of virtually all models of ventilators including: Adult, Pediatric, Anesthesia, Neonatal, and High-frequency.

This multi-functional pneumatic test system can measure 28 different test parameters and graph waveforms in real-time. It's easy operation, compact size, 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)

Ventilator Test Systems

Certifier™ Plus Test System-Standard Kit
4080-S, High Flow System with Standard Kit
- Includes Certifier™ Interface Module 4089, Certifier™ High Flow Module 4081, and accessories
- See the table on page 7 for a complete list of included components

Certifier™ Plus Test System-Full Kit
4080-F, High Flow System with Full Kit
- Everything you need for ventilator testing with a single model
- Includes Certifier™ Modules 4089, 4081, Oxygen Sensor Kit 4073, adult test lung, mounting kit, and more
- See the table on page 7 for a complete list of included components

Oxygen Sensor Kit
4073
- Measures oxygen concentration from 0-100%
- Sensor connects to high flow modules via coupling and cable
- The 4073 kit can be purchased as a separate accessory
- The 4073 is included as part of the 4080-F and 4089-F kits

Optional Certifier Plus Mounting Kits
130398 & 130399
- Securely mount the Certifier Plus test system
- Interface Module Mount
- Interface + Flow Module Mount

Anesthesia Machine Testing

**Order the 4082 Certifier™ Plus
Low Flow Module kit**

- Includes N_2O gas calibration
- Low flow module must be operated with
  a Certifier™ Plus Interface Module
- See the table on opposite page for a list of
  kit components

Upgrading from the Certifier™ FA+ to the Certifier™ Plus

**Order the 4089 or 4089-F Certifier™ Plus
Interface Module kit**

- 4089 interface module works with existing 4081
  and 4082 flow modules
- 4089 kits include an updated flow module cable
- See the table on page 4 for a complete list
  of included components

Optimize Your Setup and Save Space

- Mount to ventilator rails, mobile carts, IV poles,
  and more
- Helps to make efficient use of limited space
- Adjust mount to optimize the positioning of your
  test setup

Certifier™ Plus Instrument Kits

Parts	Description	4080-S High Flow System, Std. Kit	4080-F High Flow System, Full Kit	4081 High Flow Module Kit	4082 Low Flow Module Kit	4089 Interface Module, Std. Kit	4089-F Interface Module, Full Kit
4089	Interface module	■	■			■	■
4081	High flow module	■	■	■			
4082	Low flow module				■		
4073	Oxygen sensor kit		■				■
1602341	Inlet filter, 22mm M/F	■	■				
1611221	Adapter, high pressure	■	■	■			
1102091	Adapters, 22mm x 6mm (2)	■	■	■			
1102093	Adapter, 15mm ID x 22mm OD	■	■	■			
1611330	Airway pressure fitting	■	■	■			
3002053	Pressure tubing, silicone	■	■	■			
2913110	Velcro strap (for use with 4081)	■	■	■			
130384	Flow module cable, coiled	■	■			■	■
130400	Power supply with plug set	■	■			■	■
130385	Li-ion battery (installed)	■	■			■	■
130392	Protective cover (attached)	■	■			■	■
130389	Hybrid carrying case	■				■	
130396	Adult test lung, 1.0L		■				■
130399	Mounting kit, interface + flow		■				■
130373	Adapter, 22mm F to 22mm F		■				■
130374	Adapter, 15mm M to 22mm F		■				■
130370	Stylus, capacitive touch		■				■
130393	Deluxe carrying case, fitted		■				■
1602342	Inlet Filter, 3/8 to 1/2 inch barb				■		
1601180	Coupling, 3/8 inch tube				■		
1601179	Adapter, 3/8 inch tube to barb				■		

To find product accessories, visit the product page at tsi.com.

Features and Specifications
Certifier™ Plus Test Systems

Models 4080-S, 4080-F

Features	Certifier Plus
Gas Calibrations	Air, O_2, Air/O_2 mixtures, N_2, CO_2, N_2O
Flow Direction	Bi-directional (4081 high flow module)
Gas Conditions	STP, ATP, BTPS, BTPD, plus user-defined
Temperature & Pressure Compensated	Yes
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 (4-cell)
AC adapter	Yes
Data acquisition	Save measurement data and screen captures to internal memory, USB export
Export / Import	USB

Measurements	Gas/Mode	Range	Accuracy**
Flow Rate – High Flow	Air, O_2	-200 to +300 slpm*	± 2% or 0.075 slpm
	Air/O_2 mixtures	0 to 300 slpm	± 3% or 0.1 slpm
	N_2	-200 to +300 slpm	± 3% or 0.1 slpm
	CO_2	-40 to +40 slpm	± 3% or 0.1 slpm
Flow Rate – Low Flow	Air, O_2	0.01 to 20 slpm	± 2% and 0.008 slpm
	N_2, CO_2	0.01 to 20 slpm	± 3% and 0.010 slpm
	N_2O	0.01 to 20 slpm	± 4% and 0.025 slpm
Inhaled Volume – High Flow	Air, O_2	0.01 to 10 std liters	± 2% and 0.02 liters
	Air/O_2 mixtures	0.01 to 10 std liters	± 4% and 0.02 liters
Exhaled Volume – High Flow	Air, O_2	0.01 to 10 std liters	± 3% and 0.03 liters
	Air/O_2 mixtures	0.01 to 10 std liters	± 4% and 0.04 liters
Inhaled Volume – Low Flow	Air, O_2	1 to 100 std mL	± 2% or 2 mL
	N_2O	1 to 100 std mL	± 4% or 2 mL
Minute Volume	MV	0.01 to 100 std liters	± 3%
Low Pressure	PIP, PEEP, P_{MAP}, P_{MIN}, PΔ, P_{PLAT}	-25 to +150 cm H_2O	± 0.5% or 0.15 cm H_2O
High Pressure	P_{High}	-10 to +150 psi	± 1% or 0.1 psi
Barometric Pressure	P_{ABS}	7 to 23 psi	± 0.16% psi (11 mbar)
Respiratory Times	t_I, t_{IP}, t_{I+P}, t_E, t_R	0.04 to 30 secs	± 2% or 0.01 secs
I:E Ratios	I:E, I:E_{I+P}	1:100 to 100:1	± 4%
Respiratory Rate	f	1 to 1500 bpm	± 2% or 0.01 bpm
Static Compliance	C_{STAT}	0.01 to 1000 mBar/mL	± 3% or 1 mbar/mL
Oxygen Concentration	O_2%	21% to 100%	± 2%
Temperature	T	5 to 40°C	± 1°C at flow rates above 2 L/min

* slpm = Standard Liters per Minute
** Accuracy stated as percent of reading at TSI standard gas conditions
See operator's manual for more complete specifications

Find out more at
tsi.com/certifierplus

Knowledge Beyond Measure.