

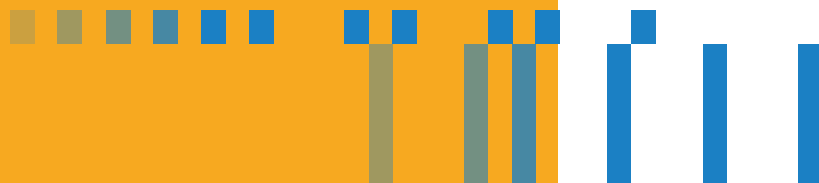


® Knowledge
Beyond
Measure.



Testing Biomedical Equipment Has Never Been Easier

Certifier™ Flow Analyzer
Test Systems for Gas Flow Analysis



When Workflow Speed and Accuracy Matters

Certifier™ Flow Analyzers Handheld and Benchtop Test Systems

The Certifier™ Plus and Certifier™ Pro Flow Analyzers are multi-functional pneumatic test systems that combine flow, pressure, temperature, and oxygen concentration measurements. Certifier Flow Analyzers utilize TSI® flow sensing technology which is optimized for medical applications where accuracy and reliability are key requirements.

The Certifier Plus and Certifier Pro offer a familiar user interface that is simple and easy to use with a compact and durable instrument design. Certifier Flow Analyzers are the go-to tool for manufacturers and biomedical professionals to efficiently test and service respiratory medical equipment. These instruments are trusted worldwide in hospital, manufacturing, home-care, and laboratory settings.

Key Features and Benefits

- High flow accuracy - temperature and pressure compensated
- Color touchscreen displays up to 18 parameters
- Intuitive user interface is simple to operate
- Real-time graphing
- Automatic breath detection
- User configurations, transfer between Certifier instruments
- Save data and screenshots, USB export
- AC power and rechargeable battery operation
- Flow compare to perform flow self-checks
- Durable and compact instrument design
- 2-year warranty included

Measure 28 Different 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

Test a Wide Range of Medical Equipment

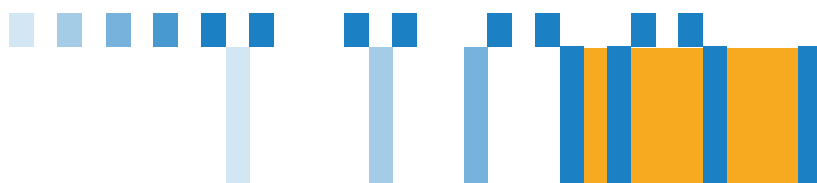
- Mechanical ventilators
- Anesthesia machines
- Air-Oxygen blenders
- Medical insufflators
- Oxygen concentrators
- Positive air pressure devices

Users and Applications

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

Choose the Certifier Model That's Right for You

	Certifier™ Pro	Certifier™ Plus
Flow Accuracy	1.75%	2%
Design	All-in-one flow channels	Modular flow modules
Oxygen Sensor	Integrated	External
Operation	Benchtop	Handheld
Setup Time	■	
Portability		■



Certifier™ Pro Flow Analyzer Test System



The Certifier™ Pro Flow Analyzer is a benchtop test system that combines high and low flow, pressure, temperature, and oxygen concentration measurements in an all-in-one flow analyzer. The Certifier™ Pro precisely measures high and low flows with an accuracy of 1.75% of reading throughout the entire flow range.

The Certifier Pro touchscreen display is mounted at an angle for easy operation and data viewing. The instrument can be operated on battery power, and users can power down flow channels when not in use to extend battery operation.

The Certifier Pro can measure air, oxygen, carbon dioxide, nitrogen, and nitrous oxide gas flows. This full-featured test instrument can be used to test most types of ventilators and anesthesia gas delivery machines as well as a variety of other respiratory medical devices.

Certifier™ Pro Instrument Kit includes:

Material Description	Part Number
Certifier Pro Flow Analyzer	4090
High Flow Inlet Filter, 22 mm x 22 mm M/F, HEPA	1602341
Low Flow Inlet Filter, 1/4 inch, HEPA, plus tubing	1602317
Adapter, high pressure port	1611221
Adapter, 22 mm x 6 mm, qty 2 (to connect to Low Flow Filter to high flow channel using 130373 F/F adapter)	1102091
Adapter, 15 mm ID x 22 mm OD	1102093
Adapter, 22mm F to 22mm F, Straight	130373
Adapter, 15mm M to 22mm F, Pediatric cuff	130374
Airway pressure fitting with screen	1611330
Pressure tubing, silicone, 1/8-inch ID x 1/4-inch OD x 48 in.	3002053
Power supply 100/240 VAC to +12 VDC 2.1 mm plug, includes plug set with NA, UK, EU, CN, SAA connectors	130400
Oxygen sensor cell (installed)	130377
Battery, 4 cell Lithium-Ion 7.2 V 6.4 Ahr (installed)	130385
Hanging Clip (to hang the instrument from a ventilator rail)	130375
Optional Carrying Case	
<ul style="list-style-type: none"> Fitted for the Certifier Pro, dimensions 19 x 14.75 x 6.5 inches Hard outer shell and foam protection 	130378



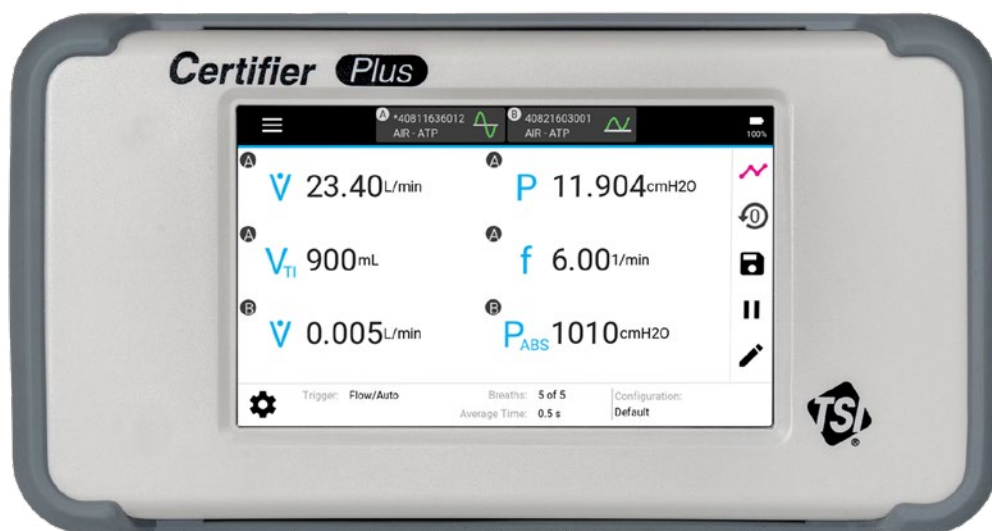
Certifier™ Plus Flow Analyzer Test System

The Certifier™ Plus Flow Analyzer is a handheld test system with a compact and lightweight design. This portable instrument operates up to 8 hours continuously on battery power and can be mounted to a ventilator or workbench. The flow analyzer measures at 2% of reading throughout its entire flow range.

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

The Certifier Plus 4081 High Flow Module measures bi-directional air, oxygen, carbon dioxide, and nitrogen gas flows. The 4082 Low Flow Module measures uni-directional air, oxygen, carbon dioxide, nitrogen, and nitrous oxide gas flows. Users can operate the Certifier Plus with two flow modules (both 4081 and 4082) plugged in and simultaneously providing measurements.

- Module components include 4089 Interface Module, 4081 High Flow Module, and 4082 Low Flow Module
- Certifier Plus 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 (see page 7 for a complete list)



Ventilator Testing



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

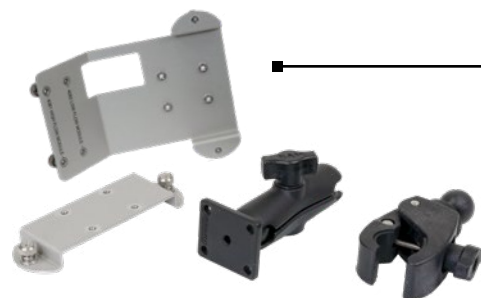
- Everything you need for ventilator testing with a single model
- Includes Certifier™ Modules 4089, 4081, Oxygen Sensor Kit 4073, adult test lung, mounting kit, and more
- See the table on page 7 for a complete list of included components



Certifier™ Plus 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
- 4073 kit not compatible with Certifier Pro



Certifier™ Plus Mounting Kits

130398 & 130399

- Securely mount the Certifier Plus test system
- Interface Module Mount (130398)
- Interface + Flow Module Mount (130399)
- 130399 is included as part of both the 4080-F and 4089-F kits

Certifier™ Plus Anesthesia Machine Testing

Order the 4082 Certifier™ Plus Low Flow Module kit

- Includes N₂O 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 Certifier™ Plus Interface Module replaces the 4088 Certifier™ FA+ Interface Module
- 4089 interface module works with existing 4081 and 4082 flow modules
- 4089 kits include an updated flow module cable
- See the table on page 7 for a complete list of included components



Optimize Your Setup and Save Space with the Certifier™ Plus

- Mount the Certifier™ Plus 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™ Flow Analyzer Test Systems

Models 4090, 4080-S, 4080-F

Features	Certifier Flow Analyzer
Gas Calibrations	Air, O ₂ , Air/O ₂ mixtures, N ₂ , CO ₂ , N ₂ O
Flow Direction	Bi-directional (for high flow)
Gas Conditions	STP, ATP, BTPS, BTPD, plus user-defined
Temperature & Pressure Compensated	Yes
Max Breath Rate	1500 BPM
Pressure Measurements	Low, High, Barometric
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
Warranty	2 Year

4090 Specifications – Flow

Measurements	Gas/Mode	Range	Accuracy**
Flow Rate – High Flow	Air, O ₂	-200 to +300 slpm*	± 1.75% and 0.05 slpm
	Air/O ₂ mixtures	-200 to +300 slpm	± 3% and 0.075 slpm
	N ₂	-200 to +300 slpm	± 3% and 0.05 slpm
Flow Rate – Low Flow	CO ₂	-40 to +40 slpm	± 3% and 0.05 slpm
	Air, O ₂	0.01 to 20 slpm	± 1.75% and 0.008 slpm
	N ₂ O	0.01 to 20 slpm	± 3% and 0.025 slpm
	N ₂	0.01 to 20 slpm	± 3% and 0.01 slpm
	CO ₂	0.01 to 20 slpm	± 3% and 0.01 slpm

4080 Specifications – Flow

Measurements	Gas/Mode	Range	Accuracy**
Flow Rate – High Flow	Air, O ₂	-200 to +300 slpm	± 2% and 0.075 slpm
	Air/O ₂ mixtures	-200 to +300 slpm	± 3% and 0.1 slpm
	N ₂	-200 to +300 slpm	± 3% and 0.075 slpm
Flow Rate – Low Flow	CO ₂	-40 to +40 slpm	± 3% and 0.075 slpm
	Air, O ₂	0.01 to 20 slpm	± 2% and 0.008 slpm
	N ₂ O	0.01 to 20 slpm	± 3% and 0.025 slpm
	N ₂	0.01 to 20 slpm	± 3% and 0.01 slpm
	CO ₂	0.01 to 20 slpm	± 3% and 0.01 slpm

* slpm = Standard Liters per Minute

** Accuracy stated as percent of reading at TSI standard gas conditions

Measurements	Gas/Mode	Range	Accuracy**
Inhaled Volume – High Flow	Air, O ₂	0.01 to 10 liters	± 2% and 0.02 liters
	Air/O ₂ mix, N ₂ , CO ₂	0.01 to 10 liters	± 3% and 0.02 liters
Inhaled Volume – Low Flow	Air, O ₂	0.01 to 10 liters	± 2% and 0.005 liters
	N ₂ O, N ₂ , CO ₂	0.01 to 10 liters	± 3% and 0.005 liters
Exhaled Volume – High Flow	Air, O ₂	0.01 to 10 liters	± 2.5% and 0.02 liters
	Air/O ₂ mix, N ₂ , CO ₂	0.01 to 10 liters	± 3% and 0.04 liters
Minute Volume – High Flow	Air, O ₂ , Air/O ₂ mix, N ₂ , CO ₂	0.01 to 100 liters	± 3% and 0.02 liters
Minute Volume – Low Flow	Air, O ₂ , N ₂ O, N ₂ , CO ₂	0.01 to 100 liters	± 3% and 0.005 liters
Low Pressure	PIP, PEEP, P _{MAP} , P _{MIN} , P _Δ , P _{PLAT}	25 to +150 cm H ₂ O	± 0.5% or 0.15 cm H ₂ O
High Pressure	P _{High}	-10 to +150 psi	± 1% or 0.1 psi
Absolute Pressure	P _{ABS}	50 to 200 kPa	± 0.7% kPa
Static Compliance	C _{STAT}	0.01 to 1000 cm H ₂ O/mL	± 3% or 1 cm H ₂ O/mL
Respiratory Time	t _I , t _{IP} , t _{HP} , t _E , t _R	0.04 to 30 secs	± 2% or 0.01 secs
Respiratory Rate	f	1 to 1500 bpm	± 2% or 0.01 bpm
I:E Ratio	I:E, I:E _{HP}	1:100 to 100:1	± 4% of reading
Oxygen Concentration	O ₂ %	21% to 100%	± 2% of reading
Temperature	T	5 to 40°C	± 1°C at flow rates above 2 L/min

See operator's manual for more complete specifications

Specifications are subject to change without notice

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