FlowAnalyser PF-300, PF-301, PF-302

Technical Specifications

Flow and pressure measurements		Range	Accuracy
Flow	Measuring direction	Bidirectional	
	Temperature compensated	Automatic	
	Pressure compensated	Automatic	
	Humidity compensated	Automatic	
	O_2 compensated	Automatic	
	High Flow	± 300 L/min	± 1.75 %* or ± 0.1 L/min**
	Low Flow	± 20 L/min	± 1.75 %* or ± 0.04 L/min**
Pressure	High Pressure (P_{High})	0–10 bar	± 1 %* or ± 10 mbar**
	Differential Pressure (P_{Diff}) (PF-300 only)	± 150 mbar	± 0.75 %* or ± 0.1 mbar**
	Relative Pressure (PF-301 and PF-302)	± 150 mbar	± 0.75 %* or ± 0.1 mbar**
	Low Pressure (for PF-302 only)	0–5 mbar	± 1 %* or ± 0.01 mbar**
	Pressure in High Flow Channel ($P_{Channel}$)	0–150 mbar	± 0.75 %* or ± 0.1 mbar**
	Atmospheric Pressure (P_{Atmo})	0–1150 mbar (abs)	± 1 %* or ± 5 mbar**
	Vacuum Pressure (for PF-301 only)	± 1000 mbar	± 0.5 %* or ± 2 mbar**
Units	Flow	L/min, L/s, cfm, mL/min, mL/s	
	Pressure	bar, mbar, cmH_2O, inH_2O, Torr, inHg, hPa, kPa, mmHg, PSI	

Other measurements		Range	Accuracy
Oxygen	Concentration	0–100 %	± 1 % O_2**
	Pressure compensated	≤ 150 mbar	
Temperature	In High Flow Channel	0–50 °C	± 1.75 %* or ± 0.5 °C**
Dew point	In High Flow Channel	-10–50 °C	± 2 %* or ± 1 °C**
Humidity	In High Flow Channel	0–100 %	± 3 %**
CO_2	Concentration (with optional OR-703)	0–10 %	± (0.2 % ABS + 2 % REL)
		10–20 %	± (0.3 % ABS + 4 % REL)
N_2O	Concentration (with optional OR-703)	0–100 %	± (2 % ABS + 2 % REL)
HAL, ISO, ENF	Concentration (with optional OR-703)	0–8 %	± (0.15 % ABS + 5 % REL)
		8–12 %	± (0.2 % ABS + 10 % REL)
SEV	Concentration (with optional OR-703)	0–10 %	± (0.15 % ABS + 5 % REL)
		10–15 %	± (0.2 % ABS + 10 % REL)
DES	Concentration (with optional OR-703)	0–22 %	± (0.15 % ABS + 5 % REL)
		22–25 %	± (0.2 % ABS + 10 % REL)
Gas types		Air, O_2, Air/O_2, N_2O/O_2, He, He/O_2, N_2, N_2O CO_2, customised gas types	
Gas standards		ATP, ATPD, ATPS, AP21, STP, STPH, BTPS, BTPS-A, BTPD, BTPD-A, 0/1013, 20/981, 15/1013, 25/991, 20/1013, NTPD, NTPS	

Ventilation parameters [1]		Range	Accuracy
Breath rate	Rate	1–1000 bpm	±1 bpm or ± 2.5 %**
Time	T_I, T_E	0.05–60 s	± 0.02 s
Ratio	I:E	1:300–300:1	± 2.5 %*
	T_I/T_{Total}	0–100 %	± 5 %*
Breath volumes	Vti, Vte (@Low Flow)	± 10 L	± 1.75 % or ± 0.10 mL (> 2.4 sL/min)
	Vti, Vte (@High Flow)	± 10 L	± 1.75 % or ± 0.20 mL (> 6.0 sL/min)
Minute volume	Vi, Ve	0–300 sL/min	± 2.5 %*
Pressure	P_{Peak}, P_{Mean}, PEEP, $P_{Plateau}$	0–150 mbar	± 0.75 %* or ± 0.1 mbar**
Peakflow	PF_{Insp}, PF_{Exp}	± 300 sL/min	± 1.75 %* or ± 0.1 sL/min**
Compliance	C_{Stat}	0–1000 mL/mbar	± 3 %* or ± 1 mL/mbar**
Trigger	Adult, Pediatric, HFO, ext. Trigger	Adult, Pediatric, HFO; Adjustable on flow or pressure curves with user-defined limits.	

General information	
Power	100–240 VAC, 50/60 Hz
Battery	3 hours (with OR-703 2 hours)
Power consumption	25 VA
Weight	3.7 kg
Dimensions (w × d × h)	22 × 25 × 12 cm
Data Storage	Internal
Display	Intuitive user interface with numerical measuring values, statistics, volume trigger configuration, gas type selection and calibration menus.
Interfaces	USB for Windows Software FlowLab, RS-232 for individual communication, TTL for external trigger and TSI4000 Protocol.
Calibration	Annually
Conditions Ambient temperature	15–40 °C (59–104 °F)
Conditions Humidity	10–90 % R.H.***
Approvals	CE, CSA (North America), IEC 61010-1:2010, IEC 61326-2:2012

The greater tolerance is valid:
*Tolerance related to the measured value, ** Absolute tolerance, *** Non-condensing, **** The unit sL/min is based on ambient conditions of 0 °C and 1013.25 mbar (DIN 1343).

[1] Tolerance related to the optimal calibration of the trigger.

Accessories

CITREX and FlowAnalyser

Meeting the Requirements in the Field

MultiGasAnalyser OR-703 (Optional for FlowAnalyser and CITREX H5)
The MultiGasAnalyser OR-703 measures all anaesthesia and breathing gases and is the smallest multi-gas sensor in the world. It includes the most modern microsystems technology and has a direct data interface with the FlowAnalyser or CITREX H5. Key features include complete data collection and test reports.

Oxygen measurement (CITREX)
Fast and precise measurement of oxygen concentration is an important function when verifying and calibrating ventilators. This option is available for new devices or can be acquired subsequently as a retrofit set.

Inlet pipe (CITREX)
Test setup tool.

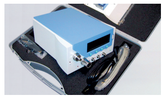
USB car adapter (CITREX)
This adapter allows charging your CITREX device in every car.

Protection filter RT019 (CITREX)
To protect your device from dust and dirt.

Carrying case (FlowAnalyser)
The FlowAnalyser case provides protection and order at work. This robust case includes storage space for your FlowAnalyser, adapter set, bacteria filter, power and USB cord, FlowLab software and user manual.

SmartLung and EasyLung (CITREX and FlowAnalyser)
The most intelligent and cost-effective test lungs that safely test ventilators and anaesthesia machines for function and precision. SmartLung and EasyLung are extremely handy and user-friendly.

Adapter set (CITREX and FlowAnalyser)
The adapters contained in the set allow connection of virtually any test object to the device.



These accessories represent only a selection from our product catalogue.
Please ask for further information.

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Highest Precision Analysers

Technical Specifications and Accessories

analyser
the art of measuring

Gas Flow Analysers and Ventilator Testers to test any Medical Device that exerts Pressure or produces Flow.

Our analysers precisely measure flows, pressures, gas temperature, humidity and oxygen concentration. They can be used to test many types of ventilators and a variety of medical gas flow and pressure devices such as oxygen concentrators, endoscopic insufflators, anaesthesia machines, flow meters, pressure gauges, suction devices and piped gases. Devices from IMT Analytics are designed to perform calibration or verification during preventive or periodic maintenance or repair service.

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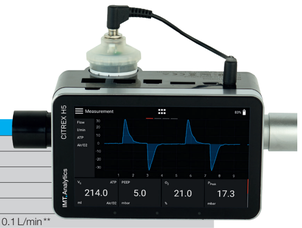
CITREX H5

Technical Specifications



Flow and pressure measurements		Range	Accuracy
Flow	Measuring direction	Bidirectional	
	Temperature compensated	Automatic	
	Pressure compensated	Automatic	
	Humidity compensated	Manually	
	O_2 compensated	–	
	High Flow	± 300 L/min	± 1.9 %* or ± 0.1 L/min**
	Low Flow	–	
Pressure	High Pressure (P_{High})	0–10 bar	± 1 %* or ± 10 mbar**
	Differential Pressure (P_{Dif})	± 200 mbar	± 0.75 %* or ± 0.1 mbar**
	Relative Pressure	–	
	Low Pressure	–	
	Pressure in High Flow Channel ($P_{Channel}$)	-50–150 mbar	± 0.75 %* or ± 0.1 mbar**
	Atmospheric Pressure (P_{Atmo})	500–1150 mbar	± 1 %* or ± 5 mbar**
	Vacuum Pressure	–	
Units	Flow	L/min, L/s, cfm, mL/min, mL/s	
	Pressure	bar, mbar, cmH_2O, inH_2O, Torr, inHg, hPa, kPa, mmHg, PSI	

Other measurements		Range	Accuracy
Oxygen	Concentration	0–100 %	± 1 % O_2**
	Pressure compensated	≤ 150 mbar	
Temperature	In High Flow Channel	0–50 °C	± 1.75 %* or ± 0.5 °C**
Dew point	–		
Humidity	–		
CO_2	Concentration (with optional OR-703)	0–10 %	± (0.2 % ABS + 2 % REL)
		10–20 %	± (0.3 % ABS + 4 % REL)
N_2O	Concentration (with optional OR-703)	0–100 %	± (2 % ABS + 2 % REL)
HAL, ISO, ENF	Concentration (with optional OR-703)	0–8 %	± (0.15 % ABS + 5 % REL)
		8–12 %	± (0.2 % ABS + 10 % REL)
SEV	Concentration (with optional OR-703)	0–10 %	± (0.15 % ABS + 5 % REL)
		10–15 %	± (0.2 % ABS + 10 % REL)
DES	Concentration (with optional OR-703)	0–22 %	± (0.15 % ABS + 5 % REL)
		22–25 %	± (0.2 % ABS + 10 % REL)
Gas types		Air, O_2, Air/O_2, N_2O, N_2O/O_2, He/O_2, N_2, CO_2	
Gas standards		ATP, ATPD, ATPS, AP21, STP, STPH, BTPS, BTPS-A, BTPD, BTPD-A, 0/1013, 20/981, 15/1013, 25/991, 20/1013, NTPD, NTPS	

Ventilation parameters		Range	Accuracy
Breath rate	Rate	1–1000 bpm	± 1 bpm* or ± 2.5 %**
Time	T_I, T_E	0.05–60 s	± 0.02 s
Ratio	I:E	1:300–300:1	± 2.5 %*
	T_I/T_{Cyc}	0–100 %	± 5 %*
Breath volumes	V		±2 %* or ±0.20 mL (>6 sL/min)**
	Vti, Vte	± 10 L	±2 %* or ±0.20 mL (>6 sL/min)**
Minute volume	Vi, Ve	0–300 sL/min	±2.5 %*
Pressure	P_{Peak}, P_{Mean}, PEEP, $P_{Plateau}$, IPAP	0–150 mbar	±0.75 %* or ±0.1 mbar**
Peakflow	PF_{Insp}, PF_{Exp}	±300 sL/min	±1.9 %* or ±0.1 sL/min**
Compliance	C_{Stat}	0–1000 mL/mbar	±3 %* or ±1 mL/mbar**
Trigger	Adult, Pediatric, HFO, ext. Trigger	Adult, Pediatric, HFO; Adjustable on flow or pressure curves with user-defined limits.	

General information	
Power	100–240 VAC, 50/60 Hz
Battery	5 hours
Power consumption	2.5–6 W
Weight	0.52 kg
Dimensions (w × d × h)	11.4 × 7 × 7.3 cm
Data storage	Internal and microSD Card
Display	4.3" Multi-Touch (color), Realtime curves
Interfaces	RS-232, USB, Ethernet, CAN, Analog Out, TTL, WLAN
Calibration	Annually
Conditions Ambient temperature	15–40 °C (59–104°F)
Conditions Humidity	10–90 % R.H.***
Approvals	CE, BC (Energy Efficiency for Battery Charging Systems), CSA (North America), IEC 61010-1:2010, IEC 61326-2:2012

The greater tolerance is valid: *Tolerance related to the measured value, ** Absolute tolerance, *** The unit sL/min is based on ambient conditions of 0 °C and 1013.25 mbar (DIN 1343).

CITREX H4

Technical Specifications

Flow and pressure measurements		Range	Accuracy
Flow	Measuring direction	Bidirectional	
	Temperature compensated	Automatic	
	Pressure compensated	Automatic	
	Humidity compensated	Manually	
	O_2 compensated	–	
	High Flow	± 300 sL/min***	± 1.9 %* or ± 0.1 sL/min**
	Low Flow	–	
Pressure	High Pressure (P_{High})	0–10 bar	± 1 %* or ± 10 mbar**
	Differential Pressure (P_{Dif})	± 200 mbar	± 0.75 %* or ± 0.1 mbar**
	Relative Pressure	–	
	Low Pressure	–	
	Pressure in High Flow Channel ($P_{Channel}$)	-50–150 mbar	± 0.75 %* or ± 0.1 mbar**
	Atmospheric Pressure (P_{Atmo})	500 – 1150 mbar	± 1 %* or ± 5 mbar**
	Vacuum Pressure	–	
Units	Flow	L/min, L/s, cfm, mL/min, mL/s	
	Pressure	bar, mbar, cmH_2O, inH_2O, Torr, inHg, hPa, kPa, mmHg, PSI	

Other measurements		Range	Accuracy
Oxygen	Concentration	0–100 %	± 1 % O_2**
	Pressure compensated	≤ 150 mbar	
Temperature	In High Flow Channel	0–50 °C	± 1.75 %* or ± 0.5 °C**
Dew point	–		
Humidity	–		
CO_2	–		
N_2O	–		
HAL, ISO, ENF	–		
SEV	–		
DES	–		
Gas types		Air, O_2, Air/O_2, N_2O, N_2O/O_2, He/O_2, N_2, CO_2	
Gas standards		ATP, ATPD, ATPS, AP21, STP, STPH, BTPS, BTPS-A, BTPD, BTPD-A, 0/1013, 20/981, 15/1013, 25/991, 20/1013, NTPD, NTPS	

Ventilation parameters		Range	Accuracy
Breath rate	Rate	1–1000 bpm	±1 bpm or ± 2.5 %**
Time	T_I, T_E	0.05–60 s	± 0.02 s
Ratio	I:E	1:300–300:1	± 2.5 %*
	T_I/T_{Cyc}	0–100 %	± 5 %*
Breath volumes	V		±2 %* or ±0.20 mL (>6 sL/min)**
	Vti, Vte	± 10 L	± 2 %* or ± 0.20 mL (>6 sL/min)**
Minute volume	Vi, Ve	0–300 sL/min	±2.5 %*
Pressure	P_{Peak}, P_{Mean}, PEEP, $P_{Plateau}$, IPAP	0–150 mbar	±0.75 %* or ±0.1 mbar**
Peakflow	PF_{Insp}, PF_{Exp}	± 300 sL/min	± 1.9 %* or ± 0.1 sL/min**
Compliance	C_{Stat}	0–1000 mL/mbar	±3 %* or ±1 mL/mbar**
Trigger	Adult, Pediatric, HFO, ext. Trigger	Adult, Pediatric, HFO	

General information	
Power	100–240 VAC, 50/60 Hz
Battery	4 hours
Power consumption	2.5–6 W
Weight	0.40 kg
Dimensions (w × d × h)	11.4 × 7 × 6 cm
Data storage	microSD Card
Display	1.7" with touch control elements (color), Realtime curves
Interfaces	RS-232, USB, Ethernet, CAN, Analog Out, TTL (external Trigger Input), TSI4000 Protocol
Calibration	Annually
Conditions Ambient temperature	15–40 °C (59 –104°F)
Conditions Humidity	10–90 % R.H.***
Approvals	CE, BC (Energy Efficiency for Battery Charging Systems), CSA (North America), IEC 61010-1:2010, IEC 61326-2:2012

The greater tolerance is valid: *Tolerance related to the measured value, ** Absolute tolerance, *** The unit sL/min is based on ambient conditions of 0 °C and 1013.25 mbar (DIN 1343).

CITREX H3

Technical Specifications

Flow and pressure measurements		Range	Accuracy
Flow	Measuring direction	Bidirectional	
	Temperature compensated	Automatic	
	Pressure compensated	Automatic	
	Humidity compensated	Manually	
	O_2 compensated	–	
	High Flow	± 300 sL/min***	± 1.9 %* or ± 0.1 sL/min**
	Low Flow	–	
Pressure	High Pressure (P_{High})	–	
	Differential Pressure (P_{Dif})	–	
	Relative Pressure	–	
	Low Pressure	–	
	Pressure in High Flow Channel ($P_{Channel}$)	-50–150 mbar	± 0.75 %* or ± 0.1 mbar**
	Atmospheric Pressure (P_{Atmo})	500 – 1150 mbar	± 1 %* or ± 5 mbar **
	Vacuum Pressure	–	
Units	Flow	L/min, L/s, cfm	
	Pressure	bar, mbar, cmH_2O, mmHg, inH_2O	

Other measurements		Range	Accuracy
Oxygen	Concentration	0–100 %	± 1 % O_2**
	Pressure compensated	≤ 150 mbar	
Temperature	In High Flow Channel	0–50 °C	± 1.75 %* or ± 0.5 °C**
Dew point	–		
Humidity	–		
CO_2	–		
N_2O	–		
HAL, ISO, ENF	–		
SEV	–		
DES	–		
Gas types		Air, O_2, Air/O_2, N_2O, N_2O/O_2	
Gas standards		ATP, ATPD, ATPS, AP21, STP, STPH, BTPS, BTPS-A, BTPD	

Ventilation parameters		Range	Accuracy
Breath rate	Rate	1–1000 bpm	±1 bpm** or ± 2.5 %*
Time	T_I,	0.05–60 s	± 0.02 s
Ratio	I:E	1:300–300:1	± 2.5 %*
	T_I/T_{Cyc}	–	
Breath volumes	V		± 2 %* or ± 0.20 mL (> 6 sL/min)**
	Vti	± 10 L	± 2 %* or ± 0.20 mL (> 6 sL/min)**
Minute volume	V_I	0–300 sL/min	±2.5 %*
Pressure	P_{Peak}, P_{Mean}, PEEP, $P_{Plateau}$	0–150 mbar	±0.75 %* or ±0.1 mbar**
Peakflow	PF_{Insp}, PF_{Exp}	± 300 sL/min	± 2.0 %* or ± 0.1 sL/min**
Compliance	C_{Stat}	–	
Trigger	Adult, Pediatric, ext. Trigger	Adult, Pediatric	

General information	
Power	100–240 VAC, 50/60 Hz
Battery	4 hours
Power consumption	2.5–6 W
Weight	0.38 kg
Dimensions (w × d × h)	11.4 × 7 × 6 cm
Data storage	microSD Card
Display	1.7" with touch control elements (color), Realtime curves
Interfaces	Ethernet
Calibration	Annually
Conditions Ambient temperature	15–40 °C (59 –104°F)
Conditions Humidity	10–90 % R.H.***
Approvals	CE, BC (Energy Efficiency for Battery Charging Systems), CSA (North America), IEC 61010-1:2010, IEC 61326-2:2012

The greater tolerance is valid: *Tolerance related to the measured value, ** Absolute tolerance, *** The unit sL/min is based on ambient conditions of 0 °C and 1013.25 mbar (DIN 1343).