Technology Matrix Blood Gas Analyzers

See more features in RT's Interactive Edition.

		ALERE INC	INSTRUMENTATION LABORATORY	INSTRUMENTATION LABORATORY
Website		www.alere.com	www.ilus.com	www.ilus.com
Product		 epoc®	 GEM® Premier™ 4000 now with PLUS Technology	 GEM® Premier™ 3500
Dimensions (HxWxD, inches)		3 x 3.4 x 8.5	18 x 12 x 15	17.5 x 13 x 11.8
Weight (pounds)		~1.5	44	31.2
Calibration/Measurement	Sample volume	92 µL	65 µL micro mode, 100 µL CO-Ox/Total Bilirubin, 150 µL full menu	135 µL to 150 µL
	Calibration time	~170 sec	Automated continuous with iQM	Automated continuous with iQM
	Measurement time	~35 sec	70 sec for all tests without CO-Ox and 25 additional sec for CO-Ox	85 sec
	Analytes	11 Analytes on 1 test card: pH, PCO_2, PO_2, Na^+, K^+, Ca^{++}, Glu, Hct, Lac, and now *creatinine and *chloride Calculated values: *$cHCO_3^-$, $cTCO_2$, BE(ecf), BE(b), cSO_2, cHgb, *eGFR, *eGFR-a, *AGap, and *AGapK (*contact Alere for availability)	Measured: pH, PCO_2, PO_2, Na^+, K^+, Cl^-, iCa^{++}, Glu, Lac, Hct, tHb, COHb, HHb, MetHb, O_2Hb, Total Bilirubin; Calculated: Hct, tCO_2, BEecf (in vivo), BE(B) (in vivo), tHb(c), Ca^{++} (7.4), anion gap, P/F ratio, PAO_2, CaO_2, CvO_2, P50, O_2cap, sO_2(c), HCO_3^- std, HCO_3^-(c), $AaDO_2$, PaO_2/PAO_2, RI, CcO_2, a-vDO_2, Q_{sp}/Q_t(est), Q_{sp}/Q_t	Measured: pH, PCO_2, PO_2, Hct, Na, K, Ca, glucose, lactate; Calculated: A-aDo2, Hb, PAO_2, PaO_2/PAO_2, RI, O_2cap*, O_2Ct*, CtO_2*, CaO_2*, CvO_2*, CcO_2*, a-Qsp/Qt, P50, HCO_3^-, tCO_2, BEB, BEcecf, SO_2(c) *(*when interfaced with the GEM OPL)*
	Typical cycle time	~30 sec	95 sec	20 samples per hr
	Operating temperature	15°C to 30°C (59°F to 86°F)	12°C to 32°C (53.6°F to 89.6°F)	15°C to 35°C
	Sample type	Heparinized or un-anticoagulated arterial, venous, or capillary whole blood	Whole blood, capillary, mixed venous, arterial, venous	Whole blood, arterial, venous, or capillary
	Measurement principle	pH, iCa, PCO_2, Na, K: potentiometry; PO_2, lactate, glucose: amperometry; Hct: conductometry	Electrochemical, conductivity, CO-Ox	pH, PCO_2: potentiometry; PO_2, glucose, lactate, Na, iCa, K: amperometry; Hct: conductivity; potentiometricion-selective electrode
	Sample application	Injection	Syringe, capillary, tube, ampoule	Syringe, capillary tube, ampoule
	Data storage	Data Management System, Database and Web Server Security	100 MB (unlimited patient samples)	Storage up to 24,000 patient reports and/or >3 years of quality control
Security	Password	Yes	Yes	Yes
	QC Lockout	Yes	User definable QC and new lot lockout options	Yes
Miscellaneous	Voltage/frequency	Reader: AC input: 100-240 Vac, .5 amps, 50-60 Hz; DC output: 5 volts, 3 amps; Host: Input: 100-240 Vac, 50/60 Hz, 500 mA; Output: 5 Vdc, 3000 mA	Voltage: 100 VAC/3 Amps; Freq: 50/60 Hz	90 to 264 VAC, 50/60 Hz
	Power consumption (max)	DC output: 5 volts, 3 amps	300 VA	500 VA/300 W
	Interface	HL7	ASTM1394 and HL7	ASTM and HL7
	Approvals	FDA 510(k) clearance on epoc System and all analytes represented	FDA 510(k) clearance on system, analytes, and iQM; CE; CSA; EMC Emissions and Immunity; European Union Directive 2002/96/EC on WEEE, CEI/IEC 61010.1	FDA 510(k) clearance
Additional Features		Room-temperature card storage (up to 6 months); bar-coded test cards for quality and inventory management; fully wireless data transfer to data manager, real time (no need to dock for download).	• iQM automatically detects, corrects, and documents instrument errors, reducing error detection time to minutes for greater efficiency, superior regulatory compliance and enhanced patient care. • Single, multi-use PAK includes all testing components, is changed every 30 days and requires no refrigeration or maintenance. • GEMweb Plus custom connectivity software for enhanced access and control from any networked PC or GEM Premier 4000 analyzer.	• iQM detects, corrects, and documents errors, reducing error detection time to minutes; • Single, multi-use PAK includes all components necessary or testing, is changed every 30 days, and requires no refrigeration or maintenance

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		NOVA BIOMEDICAL	NOVA BIOMEDICAL	OPTI MEDICAL
Website		www.novabiomedical.com	www.novabiomedical.com	www.optimedical.com
Product		 Stat Profile® pHOx® ULTRA	 Stat Profile® pHOx®	 OPTI® CCA-TS Analyzer
Dimensions (HxWxD, inches)		17.2 x 22.4 x 17.3	15 x 12 x 15	5 x 14 x 9
Weight (pounds)		53	18	12 (with rechargeable battery)
Calibration/Measurement	Sample volume	60 µL to 210 µL	45 µL to 125 µL	125 µL for most cassettes, 60 µL cassette available
	Calibration time	3 to 5 min	3 to 5 min	~1 min
	Measurement time	1 to 2 min	45 to 52 sec	~1.5 min
	Analytes	pH, Po_2, Pco_2, So_2, Hct, Hb, Na, K, Cl, Ca, iMg, Glu, BUN, Creat, Lac, CO-Ox (HHb, O2Hb, COHb, MetHb, tBil)	pH, Po_2, Pco_2, So_2, Hct, Hb, Na^+, K^+, Cl, Ca, Glu, Lac	pH, Pco_2, Po_2, tHb, So_2, Na^+, K^+, iCa, Cl^-, glucose, lactate, and BUN (in various test configurations)
	Typical cycle time	Throughput up to 38 samples per hr	Throughput of 40 to 50 samples per hr	~2.5 min
	Operating temperature	Ambient operating temperature is 15°C to 30°C (59°F to 86°F)	Ambient operating temperature is 15°C to 30°C (59°F to 86°F)	10°C to 32°C (50°F to 90°F)
	Sample type	Whole blood, arterial, mixed venous, venous, capillary, serum/plasma	Whole blood, arterial, mixed venous, venous, capillary, serum/plasma	Whole blood, serum, plasma
	Measurement principle	Direct ISE, Severinghaus, Amperometric, Optical,Conductivity,Enzyme/Amperometric	Direct ISE, Severinghaus, Optical, Conductivity, Enzyme/Amperometric	Optical fluorescence and reflectance
	Sample application	Syringe, tube, capillary tube (no adapter required)	Syringe, tube, capillary tube (no adapter required)	Syringe or capillary by automatic aspiration
	Data storage	Onboard data management	All quality control data is automatically stored. Daily and cumulative statistical reports and Levey-Jennings graphs can be printed at any time.	Holds 200 patient records and 1 month of QC on board.
Security	Password	Yes; multilevel password with unique user ID No.	Yes; multilevel password with unique user ID No.	Password protected setup and operation, holds up to 300 secure operator IDs/PINs.
	QC Lockout	Yes	Yes	Yes; user definable QC and new lot lockout options
Miscellaneous	Voltage/frequency	90-264 VAC, 50/60 Hz	90-264 VAC, 50/60 Hz	120 or 240 AC/50-60 Hz
	Power consumption (max)	350 W	200 W	110 VA
	Interface	RS232 serial communication and HL7 ASTM Standard data protocols, HL7 on TCP/IP, USB ports	RS232 serial communication and HL7 ASTM Standard data protocols, HL7 on TCP/IP, USB ports	Ethernet, serial (ASTM or ASCII)
	Approvals	ISO 13485; 2003, ISO 9001; 2000 Quality System, Registration, CSA, TüV, IVDD CE Self Declared, complies to EN 61010, EN 50081,82	ISO 13485; 2003, ISO 9001; 2000 Quality System, Registration, CSA, TüV, IVDD CE Self Declared. Complies to EN 61010, EN 50081,82	FDA 510(k) clearance, CE, IVDD 98/79/EEC, UL, ISO 13485; 2003
Additional Features		Large whole blood critical care menu (20 tests), BUN, ionized Mg available exclusively from Nova; onboard co-oximeter; onboard QC cartridge provides sufficient QC materials for 30-day auto QC analysis; allows user to program frequency and select report protocol.	Onboard auto-cartridge QC; all-liquid calibration cartridge eliminates gas tanks; single reagent cartridge has all supplies for calibration and waste collection.	Single use measurement cassette with automatic sample aspiration; color touch screen interface; barcode scanner; heated measurement for cold environments.

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		RADIOMETER AMERICA INC	RADIOMETER AMERICA INC	SIEMENS HEALTHCARE DIAGNOSTICS INC
Website		www.radiometeramerica.com	www.radiometeramerica.com	www.siemens.com/diagnostics
Product		 ABL90 FLEX	 ABL800 FLEX	 RAPIDPoint® 500 system
Dimensions (HxWxD, inches)		9.8 x 17.7 x 11.4	22 x 28 x 21	21.5 x 11.5 x 16
Weight (pounds)		24	70	36.5
Calibration/Measurement	Sample volume	65 µL	95 µL full panel syringe micromode; 195 µL full panel syringe; 35-95 capillary	Max no. of patient samples per hour/max no. measured; results per hr 25/up to 325; sample size 100 µL minimum
	Calibration time	Done automatically	BG/pH per CLIA every 30 min, 1 point every 4 hrs, 2 point every 8 hrs	1 and 2 point (manual and automatic); 1 point: 30 min; 2 point: 2 hrs
	Measurement time	35 sec	80 sec (average)	~60 sec to result
	Analytes	pH, PCO_2, PO_2, Cl^-, iCa, K^+, NA^+, glucose, lactate, SO_2, tHb, O_2Hb, COHb, MetHb, HHb, HbF	pH, PCO_2, PO_2, tHb, O_2Hb, COHb, metHb, HHb, tBil, Na, K, Ca, Cl, glucose, lactate, creatinine	pH, PCO_2, PO_2, Hb, Na^+, K^+, Cl^-, iCa, glucose, lactate, neonatal total bilirubin, CO-oximeter fractions (FO_2Hb, fCOHb, fMetHb, fHHb)
	Typical cycle time	60-130 sec (depending on model)	150 sec	~60 sec
	Operating temperature	15°C to 32°C	59°F to 90°F	15°C to 32°C (59°F to 90°F)
	Sample type	Whole blood	Whole blood, pleural fluid	Whole blood
	Measurement principle	Amperometric, Potentiometric, and CO-oximetry	Electrochemical, optical	pH, iCa, Na, Cl, K: potentiometry using ISE; PCO_2: potentiometry based on Severinghaus; PO_2: amperometric; glucose: amperometric, glucose oxidase; Hb: spectrophotometric
	Sample application	N/A	Syringe, capillary, test tube	Specimen types suitable for device: whole blood, capillary, mixed venous, arterial, venous, heparin/aspiration
	Data storage	2000 patient results, 5000 Activity Log, 1000 cal Log, unlimited user IDs access verification; USB and network transmissions for additional data storage	Onboard hard drive, 2000 patient results, 1000 calibration, 1500 QC and 5000 system messages	RAPIDComm Data Management system
Security	Password	Yes	Yes; selectable by level of access	Yes
	QC Lockout	Yes	Yes	Yes
Miscellaneous	Voltage/frequency	100-240 VAC, 50/60 Hz, 130 VA	100 or 240 VAC, 50-60 Hz	N/A
	Power consumption (max)	N/A	270 VA	N/A
	Interface	Serial RS232; RJ45 ethernet port, 3 USB ports, built-in barcode reader, keyboard, mouse and monitor port. Communication: ASTM, HL7, POCT1-A.	Color touch screen, integrated barcode reader, serial line RS232, RJ45 ethernet port, option ports for mouse and keyboard, 3 USB ports.	Ethernet and RS232 via the Siemens communication protocol LIS3 and serial RS232 option
	Approvals	Contact Radiometer America	FDA 510(k), UL, CE mark, EMC emission, EMC immunity	FDA approved
Additional Features		Fast results: 35 sec on 65 µL sample with 44-55 per hr throughput; easy to use; walk-up ready; one-handed operation with integrated user guides; automated quality management supports regulatory compliance requirements: performs continuous checks and corrective actions automatically.	Part of first automatic system for automating and simplifying blood sampling and data capture from test order to result. Works with FLEXQ module for positive sample identification, automated mixing and closed sampling. IDMS whole blood creatinine, FDA labeled method for pleural fluid pH.	No maintenance, multi-use cartridge; fast time to patient results and sample to sample throughput; 28-day, onboard, automatic quality control cartridge.