POET® IQ 5-Agent Operator's Manual

CE 0123

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Revision 1

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Section 1 — Introduction

About this Manual

Criticare strongly recommends that you read at least Sections 1 through 4 (excluding Principles of Operation) in order to become familiar with the operation of the POET® IQ monitor before attempting its clinical use. After you become familiar with the basic operation, use the Table of Contents to find specific information.

NOTE

- Some information in this manual pertains only to certain models as noted. Where not otherwise noted, information pertains to all models.

Section	Title	Purpose
1	Introduction	Familiarizes you with the POET® IQ, its safe operation, and this manual.
2	Getting Started	Explains the procedures for installing the POET® IQ for the first time, and for preparing the monitor for each use.
3	Operation	Provides a complete description of the operator controls, describes how to turn the unit ON, how to connect the POET® IQ to the patient, and view patient data. Also explains agent Identification and Quantification.
4	Alarms and Status Messages	Provides a detailed explanation of alarm functions including audio, available limits and defaults, and special features.
5	Maintenance	Shows maintenance schedule and tells how to perform the required maintenance procedures.
Appx. A	Interfacing to External Devices	Provides information for connecting the POET® IQ to a printer, computer, strip chart recorder, or to other monitors.
Appx. B	Accessories	Lists the available accessories for the monitor.

Unpacking

The following table lists the items that are supplied with each POET® IQ monitor. Check the quantity of each item supplied against the quantity listed in the table. Be sure to use the correct model number (as shown in the table) for your type of POET® IQ.

NOTE

- Save the packing material for future use.

Item	Cat. No.	Quantity According to type of 602 monitor: 6A	6B	3A	3B	4A	4B
POET® IQ anesthesia gas monitor:							
-basic gas monitor, **or**	602-6A	1					
-basic 5-agent gas monitor , **or**	602-6B		1				
-gas monitor and pulse oximetry, **or**	602-3A			1			
-5-agent gas monitor and pulse oximetry, **or**	602-3B				1		
-gas monitor and pulse oximeter with UltraSync™, **or**	602-4A					1	
-5-agent gas monitor and pulse oximetry with UltraSync™	602-4B						1
Power cord:		1	1	1	1	1	1
-North America **or**	909						
-International	910						
POET® IQ Operator's manual	1186-5	1	1	1	1	1	1
Glare reduction screen:	41540B001	1	1	1	1	1	1
Gas monitoring accessories:							
-Water Chek water™ trap	618	5	5	5	5	5	5
-Chek Mate™ moisture filter	918	2	2	2	2	2	2
-Sample line	625	5	5	5	5	5	5
-Endotracheal adaptor (Straight)	616	5	5	5	5	5	5
-Scavenging kit	655	1	1	1	1	1	1
Pulse oximeter sensor:				1	1	1	1
-Adult finger sensor, **or**,	511						
-Other (as ordered)							
ECG accessories:							
-ECG Electrodes (pack of 3)	527/3					1	1
-ECG lead wires (pack of 3)	556/3					1	1
-ECG Cable						1	1
-North America	629						
-International	629A						

NOTE

- Contact Criticare Customer Service at 1-800-458-4615 if any of the equipment listed is missing or damaged. Contact your sales representative or Customer Service for additional accessories. (See **Appendix B -- Accessories**)

Visual Description

Front Panel

Some or all of the features on the front panel on your POET® IQ will resemble the following illustration, depending on which model you have:

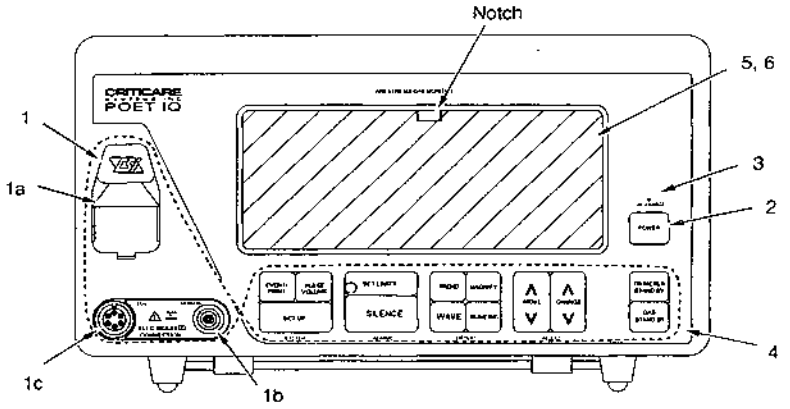


Figure 1-1. POET® IQ Model 602-4A, Front Panel.

Front panel controls and connections are described as follows:

Item	Description	Comments
1	Patient Connections consists of three parts:	
	1a Manifold	Holds the Water Chek™ (water trap) which connects to optional moisture filter (Chek Mate™) and patient sample line for gas sampling.
	1b Pulse oximeter sensor	Connects to a variety of Criticare sensors. (See **Appendix B – Accessories)**
	1c ECG connector (*models 602-4A & 602-4B only*)	Input for the ECG (Ultra Sync™) signal, either directly from the patient or from the high-level output of a separate ECG monitor.

Visual Description (cont.)

⚠ WARNING ⚠

- Use only Criticare sensors and cables. Other cables or sensors could injure the patient or cause damage to the monitor.

Item	Description	Comments
2	Power switch	Turns the power to the unit on and off.
3	AC charge indicator	Illuminates to indicate that the POET® IQ is plugged into a "live" AC receptacle and the battery is charging. If this light is off and the POET® IQ is operating, the unit is being powered by the internal battery.
4	Operator controls	These are the keys (push-button switches) which are used during normal operation of the POET® IQ (see **Section 3 -- Operation** for details)
5	Display	Shows patient waveforms, trends, numerical values, and alarm/status messages.
6	Glare reduction screen	Reduces reflections of ambient light on the display. Although this screen reduces display intensity by 35%, it can be removed if desired by prying with a small screwdriver (use notch in top center of screen as shown in Figure 1-1).

⚠ CAUTION ⚠

- Be careful not to allow the edges of the glare reduction screen to scratch the surrounding bezel while removing or replacing it.

Visual Description (cont.)

Rear Panel

The following illustration shows the connectors on the rear panel of the POET® IQ. The rear panel features are described in the following paragraphs.

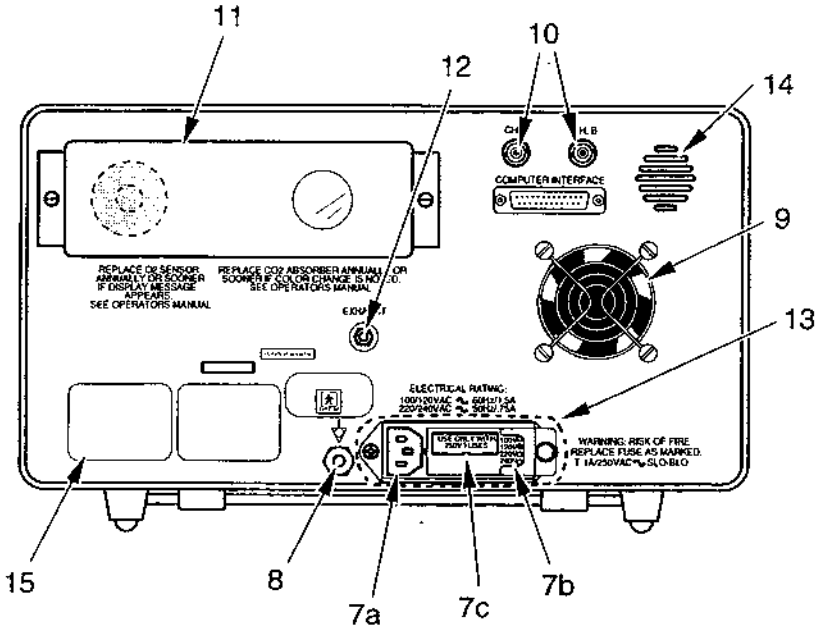


Figure 1-2. POET® IQ, Model 602-4A, Rear Panel.

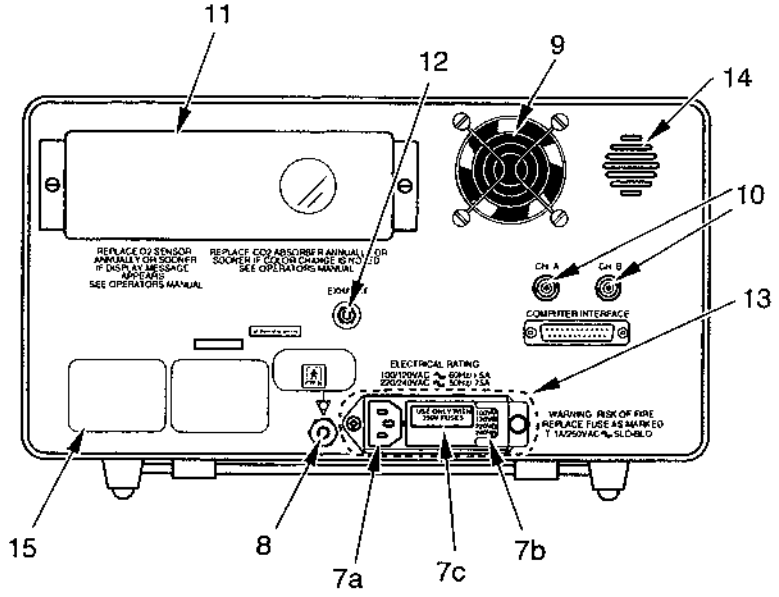


Figure 1-3. POET® IQ, Model 602-4B, Rear Panel.

Visual Description (cont.)

Rear Panel (cont.)

Item	Description	Comments
7	Power entry module	Consists of three parts:
	7a AC receptacle	Receptacle for power cord
	7b Voltage adjuster	This switch sets the POET® IQ power supply to the required AC line voltage (100, 120, 220, or 240 volts, 50/60 Hz).
	7c Fuse	This is the protective fuse for the POET® IQ.
8	Equipotential terminal 	This terminal is at chassis ground potential. It can be used for electrical safety tests, or to connect to the equipotential terminals on other medical equipment.
9	Computer interface	This is the RS-232 and RS-422 serial interface connector. (See **Appendix A -- Interfacing to External Devices** for details.)
10	Analog outputs	These are two independent analog outputs (Channel A and Channel B). The output from each channel is controlled by software. (See **Appendix A -- Interfacing to External Devices**.)
11	Protective cover	The O_2 cell and the CO_2 absorber are located behind this protective cover. The window allows viewing the CO_2 absorber for color change (See **Section 5 -- Maintenance**.).
12	Sample gas exhaust	Connects to the scavenging system with Criticare scavenger kit (Cat. No. 655) only.
13	Cooling fan exhaust	Keep this opening clear of obstructions.
14	Speaker	Produces audible alarm tones.
15	Model and serial number label	

Visual Description (cont.)

Bottom Panel

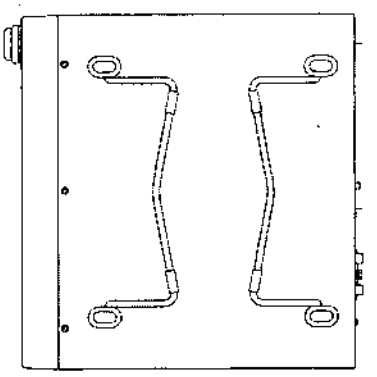


Figure 1-4. POET® IQ, Bottom Panel.

Item	Description	Comments
16	Feet	
17	Tilting bracket (bail)	Fold up or down individually to adjust viewing angle

⚠ CAUTION ⚠

- Do NOT use bails as carrying handles.

Visual Description (cont.)

Left Side Panel

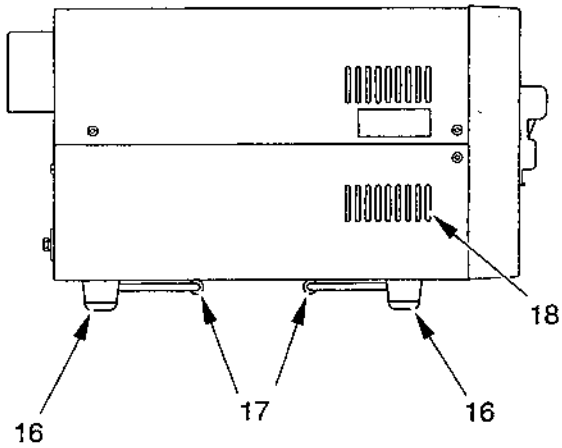


Figure 1-5. POET® IQ, Left Side Panel.

Item	Description	Comments
18	Cooling air inlets	Keep these openings clear of obstructions

Functional Description

The POET® IQ is a patient-dedicated, agent-specific anesthesia gas monitor. It is available in six versions:

- Basic gas monitor (model 602-6A)
- Basic 5-agent gas monitor (model 602-6B)
- Gas monitor with integral pulse oximeter (model 602-3A)
- 5-agent gas monitor with integral pulse oximeter (model 602-3B)
- Gas monitor and pulse oximeter with UltraSync™ ECG Synchronization (model 602-4A)
- 5-agent gas monitor and pulse oximeter with UltraSync™ ECG Synchronization (model 602-4B)

Gas Monitor

PARAMETERS

Reported values from the gas monitor in the POET® IQ consist of inspired and expired concentrations of anesthetic agent(s), carbon dioxide, oxygen, and nitrous oxide, as well as respiratory rate.

ANESTHETIC AGENTS

The POET® IQ is able to automatically Identify and simultaneously Quantify up to five anesthetic agents. Agent concentrations are not affected by the presence of ethyl alcohol or metabolic ketones.

GAS SAMPLING

Gas sampling is accomplished through a sidestream system in which 150 ml/minute (also selectable to 50 ml/minute) is drawn from the breathing circuit into the moisture-handling system before entering the POET® IQ. The patented Water Chek™ water trap and Chek-Mate™ allow the water and secretions to be captured while the gas enters the monitor for analysis.

CALIBRATION

Delayable automatic gas calibrations occur during use at predetermined intervals or as needed (See **Section 3 -- Operation** for details.). Annually verification of autocalibration is recommended (or more frequently as per your institution's quality assurance program), and manual calibration is performed only as needed. (See **Section 5 -- Maintenance**.)

AUTO OCCLUSION CLEARING

When an occlusion in the gas sample path is sensed, the POET® IQ attempts to clear it automatically. If the occlusion cannot be cleared by the fifth try or in 60 seconds, the operator is prompted to change the water trap.

Pulse Oximeter (SpO_2)

(models 602-3A, 602-3B,

This portion of the monitor reports percentage oxygen saturation (SpO_2) of hemoglobin in the blood, as well as pulse rate, through

602-4A, & 602-4B) a non-invasive sensor. A variety of disposable and reusable sensors is available from Criticare to serve your specific clinical needs.

UltraSync™ (ECG Synchronization) *(models 602-4A & 602-4B)*

This optional feature, only available with the pulse oximeter, is designed to enhance the quality of the pulse wave for accurate determination of SpO_2 in the presence of low perfusion. UltraSync uses the patient's ECG signal to synchronize to the plethysmographic signal. The ECG signal is obtained either directly from the patient (lead II) or from the output of an external ECG monitor. The ECG waveform can be displayed on the POET® IQ screen whether or not UltraSync™ is in use.

Display

Various display formats can be viewed on the gas plasma dot matrix display:

- Waveforms — Single or dual real-time waveforms of various parameters are displayed on the upper portion of the screen, while real-time numeric data for all parameters is displayed on the lower portion of the screen
- Numeric — Large numeric data for all parameters (no waveforms)
- Trend — Up to 30 hours of single or dual trends of various parameters. The single trend display also shows real-time numeric data for all parameters on the lower portion of the screen.

Alarms

The POET® IQ has audible and visual alarms for all parameters. Alarm limits can be changed from factory settings, and stored in memory (See **Section 4 -- Alarms and Status Messages** for details.).

Internal Battery

In the event of a power outage or transport, all monitoring capabilities of the POET® IQ can be powered from the internal battery for up to 40 minutes. If the monitor is on, the battery automatically takes over when AC power is not present. When the LOW BATTERY message first appears on the screen, battery power will last a minimum of approximately 15 minutes.

Principles of Operation

Halogenated Anesthetic Agents

The POET® IQ measures halogenated anesthetic agent concentrations using the principles of infrared absorption spectrometry. Infrared technology, which is widely used in gas analysis, uses light which cannot be seen by the human eye. To measure the concentration of a gas, infrared light is passed through a sample of the gas. The gas absorbs different amounts of energy at different wavelengths of light, depending on the composition of the gas being sampled. The beam of light is then filtered at a wavelength where the gas is known to absorb energy, making the intensity of the beam related to the concentration of the gas present. A detector converts the beam to an electrical signal which is processed by the monitor to provide a gas concentration reading. Advantages of infrared technology as compared with other gas analysis techniques are its reliability, low cost, and simplicity.

In the POET® IQ, anesthetic agents are automatically identified and quantified by the HIGH IQ™ patented optical bench, developed and manufactured exclusively by Criticare. Unlike standard infrared technology which uses only the 3.3 micron wavelength to quantify agents, the HIGH IQ bench uses multiple wavelengths between 3 and 20 microns.

The High IQ bench allows the components in a mixture of anesthetic agents to be simultaneously quantified despite overlapping spectra in the higher infrared range. Also, optical filters were chosen in such a way as to not allow ethyl alcohol or metabolic ketones to interfere with reported agent concentrations.

Carbon Dioxide (CO_2) and Nitrous Oxide (N_2O)

The POET® IQ measures CO_2 and N_2O using the principles of infrared absorption spectrometry similar to anesthetic agents as described above, except using a single wavelength.

Oxygen (O_2)

The POET® IQ uses a galvanic cell (which is actually a type of battery) to measure oxygen concentration. Oxygen at the cell's surface diffuses through a membrane into the cell, allowing a chemical reaction to occur. When the electrons which were transferred in the reaction are allowed to pass through an external electrical resistor, an electrical current is produced. The voltage across the resistor (which is the output voltage from the cell) is proportional to the partial pressure of oxygen at the membrane. However, the POET® IQ is calibrated to display the fractional concentration of oxygen. This number is automatically corrected for variations in pressure, temperature and flow. Hardware and software design allow the POET® IQ to report breath-by-breath inspired and expired concentrations of O_2.

Oxygen Saturation (SpO_2)

DEFINITION

In the POET® IQ monitor, pulse arterial oxygen saturation is defined as the ratio of oxygenated hemoglobin to the sum of oxygenated hemoglobin plus hemoglobin which is available for binding to oxygen.

Hemoglobin exists in the blood in several forms:

- Oxygenated (Oxyhemoglobin, or O_2Hgb)
- Reduced (Deoxyhemoglobin, or Hgb)
- Dyshemoglobins (carboxyhemoglobin and methemoglobin.)

$$\% \text{ oxygen saturation} = \frac{\text{Oxyhemoglobin}}{\text{Oxyhemoglobin + Deoxyhemoglobin}} \times 100$$

Dyshemoglobins, such as carboxyhemoglobin and methemoglobin, are not directly measured by pulse oximetry and therefore are not factored into the measurement.

METHOD

The POET® IQ's pulse oximeter non-invasively measures percentage oxygen saturation, and operates on the principles of plethysmography and spectrophotometry. In this method, two wavelengths of light are passed through a pulsating vascular bed and the resulting signals are measured by photodetectors.

Since one of the wavelengths is sensitive to oxyhemoglobin and the other to deoxyhemoglobin, the calculation for percent oxygen saturation shown above can be made electronically. These electronic signals also provide the monitor with an indication as to when an SpO_2 measurement should be made, a means to calculate pulse rate, and information which allows the effects of venous blood, skin pigmentation, and other tissue constituents to be ignored.

One of the wavelengths is used to obtain a plethysmograph (waveform based on measurement of volume changes), which can be viewed on the display.

UltraSync™ (ECG Synchronization)

UltraSync™ is Criticare's patented method for enhancing the quality of a low level plethysmographic signal from a patient with poor perfusion at the measurement site. The enhancement is accomplished through synchronization of the patient's plethysmographic and ECG signals, and allows the monitor to report SpO_2 values in clinical situations which it may otherwise not have been able to.

Symbols

Symbol	Means
	Alternating Current
	BF Equipment Type
	Refer to Operator's Manual for important information
	Equipotentiality

BF Equipment Type: 'Type B' equipment with an 'F-type' isolated (floating) part. See F Equipment Type*.

'Type B' equipment has an internal electrical power source which provides an adequate degree of protection against electric shock.

*F Equipment Type: 'F-type' isolated (floating) applied parts are isolated from all other parts of the equipment to such a degree that the allowable leakage current under single fault conditions is not exceeded when 1:1 times the highest rated mean voltage is applied between the part in question and earth.

Safety

Special Headings: Danger, Warning, Caution, Note

Special statements are preceded by the Danger, Warning, Caution, or Note heading. These statements contain important instructions which often relate to safety.

⚠ **DANGER** ⚠ indicates probable severe personal injury or death to you or others if instructions are not followed.

⚠ **WARNING** ⚠ indicates possible personal injury to you or others if instructions are not followed.

⚠ **CAUTION** ⚠ indicates possible damage to the equipment if instructions are not followed.

NOTE is used to emphasize important information.

General

⚠ **DANGER** ⚠

- A possible explosion hazard exists. Do not use the POET® IQ in the presence of flammable anesthetics.

⚠ **WARNING** ⚠

- Federal law restricts this device to sale by or on the order of a physician.
- Sevoflurane is presently not available for sale or use in the United States. Only FDA-approved investigational studies are allowed to use Sevoflurane in the United States.
- Read this manual (at least sections 1 through 4) before attempting clinical use of the POET® IQ.
- Equipment accuracy may be affected at extreme temperatures. For optimum performance, the operating environment should meet the following requirements:
  - Temperature 15-35° C (59-95° F)
  - Humidity 10-90%, noncondensing

General
(cont.)

⚠ WARNING ⚠

- The POET® IQ has been designed to protect against patient burns when used properly with HF surgical equipment. It is imperative that the operator guarantees the integrity of the HF surgical neutral electrode connection. Non-compliance could result in burns to the patient.

- Allow the battery to charge (keep unit plugged in) for eight hours following extended battery use to assure a fully charged battery is available for the next use.

- Interference or errors in readings may be caused by the presence of electrocautery or diathermy interference.

⚠ CAUTIONS ⚠

- Do not store equipment at extreme temperature. Storage temperature should be -5 to 50° C (23 to 122° F). Temperatures exceeding these limits could damage the system.

- Do not press on the keys with surgical instruments or other tools. Use only your fingertips to press on the keys. Sharp or hard objects could damage the keys.

- Use care not to stretch internal wires of probes and cables. Store probes and cables carefully after forming them into loose loops. If internal wires are stretched, electrical failures could result.

- The display screen is protected with a glare reduction covering. Abrasive cleaners or alcohol will mar the surface. Use only non-abrasive cleaners (i. e. ordinary glass cleaner). Use only a soft lint-free cloth (do not use paper towels or tissues). Refer to **Section 5 -- Maintenance** for cleaning and removal instructions.

Electrical

⚠ WARNING ⚠

- Use the POET® IQ only with the Criticare power cord. Use of a non-approved device may cause hazard to the operator or patient.
- The POET® IQ itself complies with leakage current limits required by medical safety standards for patient connected devices. There is a possible hazard caused by the summation of leakage currents when several pieces of equipment are interconnected.
- The equipotential terminal should be connected only to equipment that also complies with patient-connected medical safety standards for leakage current.
- Connect the power cord to hospital-grade outlets only.
- Be sure the power plug is connected to the POET® IQ before you plug the cord into an electrical outlet. Use hospital grade outlets only. This unit is approved by U.L. for use with hospital grade outlets.

⚠ CAUTION ⚠

- The rechargeable battery is a sealed lead-acid-type battery and is totally maintenance free. If the battery becomes defective, only a service technician should replace it.

NOTE

- The POET® IQ is electrically protected from damage due to sensor application on a patient undergoing a procedure involving electrosurgery. This also protects the patient from harmful current densities at the sensor and electrode sites in the event of a defect in the electrosurgical unit's neutral electrode. To minimize the effects of electrosurgical interference, the sensor and electrodes should be placed as far as possible from the surgical site and neutral electrode. The ECG waveform and plethysmograph may be distorted under some combinations of electrode placement and electrosurgical power levels.

Gas Monitoring

NOTE

- Change the water trap and filter as needed or weekly (or when the trap is 3/4 full). The sample line must be changed with each patient or when it is totally occluded.

⚠ WARNING ⚠

- When using a POET® IQ, models 602-3A, 602-4A, or 602-6A: If any anesthetic agents other than those chosen in the agent set in the setup screen are sampled by the POET® IQ, they will be misidentified and may interfere with reported anesthetic agent concentrations.

Pulse Oximetry
(models 602-3A, 602-3B, 602-4A, & 602-4B)

⚠ WARNING ⚠

- The pulse oximeter sensor could cause skin irritation. Inspect the pulse oximeter sensor site every four to six hours. Move the sensor to a different location if any skin irritation is present.

- Do not tape over the pulse oximeter sensor housing. Taping over the housing could cause injury and sensor failure due to too much pressure. If the sensor needs to be secured, place tape over the cable, immediately behind the sensor.

- Do not place the pulse oximeter sensor on the same extremity with a blood pressure cuff or an arterial line. Place the pulse oximeter sensor on the side of the patient opposite a blood pressure cuff or an arterial line. The occlusion of the blood flow during blood pressure determinations could affect the POET® IQ's ability to display accurate SpO_2 readings.

NOTE

- Excessive amounts of motion at the sensor site could cause errors in readings. Take new readings when motion has stopped or after moving the sensor to another site (if using model 602-4A or 602-4B, enable UltraSync™).

NOTE

- The pulse oximeter sensor is light sensitive. Too much ambient light makes it impossible for the system to provide accurate readings. The system provides a high ambient light alarm (HIGH AMBIENT) when it is necessary to shield the sensor from extraneous light sources such as phototherapy light or infrared heating lamps.

ECG *(models 602-4A & 602-4B)*

⚠ WARNING ⚠

- Use the POET® IQ only as recommended by the manufacturer. Do not use POET® IQ for intracardiac ECG application. Using the POET® IQ for intracardiac ECG application could result in injury or death.
- Use the POET® IQ only with the supplied Criticare ECG patient cable and leads. Use of non-approved cables and leads could cause injury to the operator and/or patient.
- Do not place defibrillator paddles on or adjacent to the ECG patient electrodes. Position defibrillator paddles clear of the ECG patient electrodes. Contact between defibrillator paddles and ECG patient electrodes could injure the patient.
- ECG electrodes could cause skin irritation. Examine the ECG electrode sites daily for skin irritation. Change the electrodes and reposition every 24 hours, or sooner if there is any sign of inflammation.

NOTES

- The ECG has been designed to be protected against the effects of cardiac defibrillator discharge.
- Criticare is not aware of any safety hazard due to the operation of a cardiac pacemaker or other electrical stimulators when used in conjunction with the POET® IQ.

Specifications

Configurations

Model	3 Agent	5 Agent	CO_2	O_2	N_2O	RR	SpO_2	Pulse	ECG[2]
602-3A	•		•	•	•	•	•	•	
602-4A	•		•	•	•	•	•	•	•
602-6A	•		•	•	•	•			
602-3B		•	•	•	•	•	•	•	
602-4B		•	•	•	•	•	•	•	•
602-6B		•	•	•	•	•			

Anesthetic Agents

Agents Measured[3]	Isoflurane, halothane, enflurane, desflurane, sevoflurane
Numeric Display	Automatically identifies and simultaneously quantifies up to three agents (models 602-3A, 602-4A, or 602-6A) or five agents (models 602-3B, 602-4B, or 602-6B), inspired and expired
Waveform	User selectable, autoscaling
Trend	User selectable (1-30 hours)
Effect of Ethyl Alcohol and Metabolic Ketones	None
Method	Multiple wavelength, non-dispersive infrared, autocalibrating[4]
Range	0-9.9% (hal,enf, iso, sev); 0-20.0% (des)
(concentrations out of range are preceded by > sign on display)	
Resolution	0.1 vol %
Accuracy (single agent)	
enf, sev	0-3%, ± 0.2 vol % 3-7%, ± 0.3 vol %
hal, iso	0-3%, ± 0.2 vol % 3-5%, ± 0.3 vol %
des	0-3%, ± 0.2 vol % 3-7%, ± 0.3 vol % 7-15%, ± 0.5 vol % 15-20%, unspecified
Accuracy (in a mix)	Greater of ±0.3vol% or 10% of actual value (for hal, enf, iso 0-5%, sev 0-7%, des 0-12%)
Agent ID Threshold	
Single Agents	0.35vol% (hal, enf, iso, sev); 0.55vol% (des)
Mixed Agents	A secondary agent is considered part of a mix if it is above its threshold as follows: hal/enf/iso Greater of 0.35vol% or 20% of primary agent desGreater of 0.45vol% or 20% of primary agent sevGreater of 0.35vol% or 20% of primary agent
Response Time (10-90%)	700 ms

Specifications (cont.)

Carbon Dioxide (CO_2)	
Numeric Display	End tidal and inspired (breath algorithm), or continuous real-time (user selectable)
Units	mmHg, vol %, kPa
Waveform	User selectable, with 0-60 or 0-100 mmHg scales
Sweep Speed	Normal, slow, or both
Trend	User selectable (1-30 hours)
Method	Non dispersive infrared, autocalibrating[4]
N_2O Compensation	Automatic
Range	0-99 mmHg, 0-12.5%, 0-12.5 kPa
Resolution	1 mmHg, 0.1%, 0.1 kPa
Accuracy	± 2 mmHg, ± 0.3 vol %, ± 0.3 kPa
Response Time (10-90%)	350 ms
Oxygen(O_2)	
Numeric Display	Inspired and expired
Waveform	User selectable, autoscaling
Trend	User selectable (1-30 hours)
Method	Galvanic cell
Range	0-99%
Resolution	1%
Accuracy	± 3 vol % (0-90%)
Response Time (10-90%)	600 ms
Nitrous Oxide (N_2O)	
Numeric Display	Inspired and expired
Method	Non dispersive infrared, autocalibrating[4]
Range	0-99%
Resolution	1%
Accuracy	± 3 vol %
Response Time (10-90%)	500 ms
Respiratory Rate	
Numeric Display	Yes
Trend	User selectable (1-30 hours)
Source	Capnogram
Range	0-99 breaths per minute
Resolution	1 breath per minute
Accuracy	± 2 breaths per minute
Oxygen Saturation (SpO_2)	
Numeric Display	Yes
Waveform	User selectable
Gain	User selectable (xl, x2, x5)
Trend	User selectable (1-30 hours)
Audio	Tone with each detected pulse, adjustable volume
Averaging Time	User selectable (3, 6, 9, 12, 15, 18, 21 seconds)
Search Time	User selectable (10, 20, 30, 40 seconds)
Search Warning	User selectable
Method	Dual wavelength LED
Sensors	Reusable finger probe, reusable Multi-Site™, neonatal, infant, pediatric, and adult disposables
Range	0-99%
Resolution	1%
Accuracy	70-99%, ± 2% 40-70%, ± 3%

Specifications (cont.)

Pulse Rate

Numeric Display	Yes
Trend	User selectable (1-30 hours)
Source	Primary: Plethysmograph Secondary: ECG (602-4A or 602-4B)
Range	0-250 bpm
Resolution	1 bpm
Accuracy	± 2 bpm or 1% of reading, whichever is greater

Electrocardiogram (ECG)—UltraSync™

Waveform	User selectable, autoscaling
Sweep Speed	25 mm/second
Input Source	Lead II or high level output from external monitor
Frequency Response	0.5-30 Hz
Defibrillation Protection	360 joules

Alarms

Parameters	All (see **Section 4 -- Alarms and Messages**)
Physiological	Single pitch (adjustable), adjustable volume
System	Dual pitch alternating, adjustable volume
Silence	Temporary 2 minute, or permanent until next power-up (both show prompt on screen), or (for 602-3B, 602-4B, and 602-6B *only*) until monitor comes out of standby
Note:	User-selectable choice for continuous or staged audio (physiological and system alarms)

Warm-Up Time (for full specifications)

From cold start	Less than ninety seconds (including autocalibration)
From stand-by	Instantaneous

Pneumatics

Type	Sidestream with disposable water trap (Water Chek™) and filter (Chek-Mate™)
Sample Line	8 feet, PVC or PE
Sample Rate	50 ml/min or 150 ml/min (specifications written for 150 ml/min)
Occlusion Clearing	Automatic, as needed
Automatic Calibration:	
Frequency	Start-up, 10 min., 30 min., every 8 hrs., or as needed
Duration	15 seconds or 20 seconds
Delayable	Yes (except at start-up)

Outputs

Analog (2 Channels)	User selectable (agent, CO_2, O_2, N_2O, SpO_2, pulse, pleth, nurse call) BNC connectors
Digital	RS232, RS422, user selectable format (ASCII, trend, graphic, SpaceLabs Universal Flexport™) DB-25 connector

Electrical

Specifications (cont.)

Input Voltage	100-120, 220-240 VAC (50/60 Hz)
Internal Battery	Sealed lead acid, 40 minute life typical, 8 hour recharge time
Power Consumption	70 Watts typical
Protection Degree	Class 1, type BF

Physical Properties

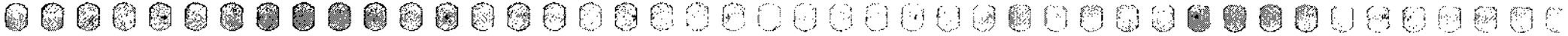
Dimensions	8-1/4" H x 14-1/8" W x 12-3/4" D
Weight	28 pounds
Display	Gas plasma dot matrix, 7.5" W x 3" H

Environmental

Operating Temperature	15 to 35°C (59 to 95° F)
Storage Temperature	-20 to 60°C (-4 to 140° F)
Humidity	10-90%, noncondensing

NOTES:

1. Specifications subject to change without notice.
2. ECG synchronization (UltraSync™) enhances the quality of the pulse signal for determination of oxygen saturation under conditions of poor perfusion or high motion.
3. When using the POET® IQ models 602-3A, 602-4A, or 602-6A: the operator selects between two sets of three agents (HAL/ENF/ISO or HAL/DES/ISO). The two agent sets for sevoflurane units (ordered separately) are HAL/ENF/ISO and HAL/SEV/ISO.
4. Verification of automatic calibration is recommended annually (or more frequently according to institution's quality assurance program). Manual calibration may be necessary every six to 12 months.



Section 2 — Getting Started

Initial Installation

The following paragraphs describe the recommended procedures for setting up the POET® IQ for the first time (some instructions refer to items shown in **Section 1 -- Introduction**).

NOTE

- If at any time the monitor does not behave as described, or you would like assistance, please call technical support at 1-800-458-2697.

1. Verify the proper setting of the input voltage selector on the AC module on the rear panel (a white indicator will show next to the voltage to which it is set).
2. Perform electrical safety testing as per your institutional protocol. (The equipotential terminal is located on the rear panel.)
3. Plug the female end of the AC power cord into the AC receptacle on the rear panel of the POET® IQ, and connect the other end to the AC receptacle outlet (the AC Charge indicator will verify AC power connection).
4. Verify the accuracy of the automatic calibration (as described in **Section 5 -- Maintenance**).
5. Place the monitor in its normal operating environment (for example, the shelf of an anesthesia machine).

⚠ WARNING ⚠

- Be sure to leave at least 1" clearance on the left side and rear of the monitor to allow adequate ventilation. Poor ventilation can impair monitor performance.

6. Press the POWER key (on the right side of the front panel) to turn the monitor on. The monitor will warm up for one minute, and will then attempt to autocalibrate. It will not be able to complete its cycle without a water trap and sample line connected. Do not connect the water trap and sample line yet.
7. Adjust the front and/or rear tilt legs on the bottom of the unit for the best viewing angle (each leg has two positions).

Initial Installation (cont.)

⚠ WARNING ⚠

- Do not place other equipment on top of the POET® IQ if the front or back bail is raised.

8. If a brighter display is desired, remove the glare-reduction screen with a small flat head screw driver. (Use the notch at the top center of the screen.)

⚠ CAUTION ⚠

- When removing or replacing the screen, be careful not to let it scratch the surrounding bezel. The glare reduction screen should be removed and replaced as infrequently as possible to prevent scratching the surrounding bezel.

NOTES

- Removing the glare-reduction screen may cause reflections that make it difficult to view patient information under certain lighting conditions.

- Avoid getting fingerprints or dirt on the glare reduction screen, especially on the inside surface. When replacing the screen, note that only one surface reduces glare; that this surface should face *away* from the monitor.

9. Connect the male Luer lock of the hose in the scavenger kit (use **ONLY** Criticare Cat. No. 655) to the sample exhaust port on the rear panel of the POET® IQ. Connect the other end of the hose to the black scavenger adaptor in the kit. Connect the adaptor between the scavenger reservoir bag and the gas machine.

⚠ CAUTION ⚠

- Route the scavenger hose in a way that will not allow it to kink during operation of the monitor. A kinked or partially kinked scavenger hose can impair the performance of the monitor. Use **ONLY** Criticare Cat. No. 655.

Software Setup

10. To complete the installation of the POET® IQ, the software configurable items should be verified (or adjusted as needed on the Setup screen). Press the SETUP key on the front panel. Use the MOVE keys (∧ and ∨) to highlight the parameters to be set, and use the CHANGE keys (∧ and ∨) to scroll through the available settings.

NOTE

- All settings on the Setup screen can be reset to factory default by powering up the unit while holding the SET LIMITS key (Release the SET LIMITS key when the Criticare screen appears).

The following is a list of each parameter as it appears in the SETUP screen, along with available and power-up default settings for each (**bold** setting is factory default):

UltraSync™ (models 602-4A & 602-4B)
Settings: **on,** off (power-up default = on)
Disables or enables ECG synchronization for the pulse oximeter. ECG waveforms are still accessible if UltraSync is off.

Oximeter average (models 602-3A; 602-3B, 602-4A, & 602-4B)
Settings: 3, 6, 9, **12**, 15, 18, 21 sec. (power-up default = previous setting)
Time taken to average SpO_2 readings before updating the screen. Lower averaging times result in a faster response to a changing SpO_2 value.

Search time (models 602-3A, 602-3B, 602-4A, & 602-4B)
Settings: 10, 20, 30, **40** sec (power-up default = previous setting)
Time between the last accepted pulse and the appearance of the PULSE SEARCH and/or SpO_2 SEARCH messages on the display.

Search warn (models 602-3A, 602-3B, 602-4A, & 602-4B)
Settings: **off**, on (power-up default = previous setting)
Enables or disables the warning message (LOW PLETH and flashing SpO_2 prompt) which appears while the pulse oximeter is searching for an acceptable pulse (before search alarm is activated). If on, warning appears 10 seconds after the last accepted pulse. The warning is intended to alert the operator that the SpO_2 value is being held since the last reliable reading.

Software Setup (cont.)

Patient (models 602-3A, 602-3B, 602-4A, & 602-4B)
Settings: **adult**, neonatal (power-up default = adult)
Switches between adult or neonatal SpO_2 alarm limit ranges as follows:

Adult:	50 - 100%
Neo:	0 - 100%

Flow rate (all models)
Settings: **150**, 50 ml/min (power-up default = 150 ml/min)
The rate at which sample gas is drawn into the POET® IQ monitor for analysis. The 50 ml/min setting may affect the gas parameter specifications, and is recommended only for situations such as low tidal volumes.

Alarms (all models)
Settings: **staged**, continuous (power-up default = previous setting)
Alarm audio scheme upon violation of any alarm limit. If set to staged, audio will sound one tone upon violation, two tones 20 seconds later, and a continuous tone 20 seconds later. If set to continuous, a continuous tone will sound immediately upon alarm limit violation.

Audio pitch (all models)
Settings: 1, 2, **3**, 4, 5, 6, (power-up default = previous setting)
Selects audio pitch for physiologic alarms and tone produced when any key is pressed.

CO_2 mode (all models)
Settings: **mmHg capno**, % capno, kPa capno, mmHg meter,% meter, kPa meter (power-up default = previous setting)
Selects CO_2 units, and CO_2 monitoring mode. Capno (capnograph) mode incorporates a breath algorithm into the display of inspired and expired CO_2 values. Meter mode gives a real-time continuous reading, and is not dependent on a cyclical waveform for numeric data as capno mode is. Changing this setting erases the trends without asking for confirmation.

Trend (all models)
Settings: 1 hr•1 sec, 2.5 hr•5 sec, 5 hr•10 sec, **7.5 hr•15** sec, 15 hr•30 sec, 30 hr•1 min (power-up default = previous setting)
Selects trend memory time and resolution (time • resolution). Changing this setting erases the trends without asking for confirmation.

Software Setup (cont.)

Port mode (all models)
Settings: **Off**, ASCII trend, ASCII print, graph 1 print, graph 2 print, (SpaceLabs, Inc.) Univ. Flexport (power-up default = previous setting)
Selects format for the serial output data (see **Appendix A -- Interfacing to the POET® IQ**).

Port time (all models)
Settings: **Off**, trend, 1, 2, 5, 10, 20, 30 sec, 1, 2, 3, 4, 5, 6, 8, 10, 15, 20, 30 min, 1, 2, 4, 8 hr (power-up default = previous setting)
Selects time interval at which a complete set of data is periodically sent through the serial computer interface (see **Appendix A -- Interfacing to the POET® IQ**).

Baud rate (all models)
Settings: 300, **1200**, 2400, 4800, 9600, 19200 (power-up default = previous setting)
Selects rate at which data is sent through the serial computer interface (see **Appendix A -- Interfacing to the POET® IQ**).

Analog A and B (all models)
Settings: **$ETCO_2$** (default for Ch A on models 602-6A and 602-6B only), Test mode, Agent, N_2O, Agent Wave, O_2 Wave, SpO_2 50-100% (worded on screen as Sat 50-100), Nurse Call, Pulse Wave, **SpO_2 0-100%** (default for Ch. A-models 602-3A, 602-3B, 602-4A, and 602-4B) (worded on screen as "O_2 Sat"), Pulse Rate, **Capnograph** (default for Ch B-all models) (power-up default = previous setting) (SpO_2 and Pulse not available on model 602-6A and 602-6B)
Two independent analog output channels which can be set to represent the parameters listed above. Nurse call can be used to trigger an external device upon activation of any alarm (see **Appendix A -- Interfacing to the POET® IQ**).

Agent Set (models 602-3A, 602-4A, or 602-6A)
Settings: For Desflurane agent set, HAL/ENF/ISO or HAL/DES/ISO. For Sevoflurane agent set, HAL/ENF/ISO or HAL/SEV/ISO.
Selects which set of three agents the POET IQ is capable of monitoring at any given time (see **Section 3 -- Operation** for warnings and details).

Time and date (all models)
Settings for the internal real-time clock. The trend screen will not function properly if the time and date are not set. Changing this setting erases the trends without asking for confirmation.

English (French, German, Spanish)
The language designator. This cannot be set by the operator. The monitor must be ordered with the desired language.

Software Setup (cont.)

Mx.x, SAx.x, GAx.x, Ex.x
Software revision for master, slave, gas (agents), and ECG (models 602-4A and 602-4B) microprocessors. (No operator settings available.)

Setup Procedures (For Each Use)

This section describes the procedures required to prepare the POET® IQ monitor for each use. It includes the basic steps that can be performed prior to making patient connections. Refer to Visual Description in **Section 1 -- Introduction** if necessary. Connecting the pulse oximeter sensor and ECG leads to the patient is described in **Section 3 -- Operation**.

NOTE

- Before beginning, check the parameters in the Setup screen (Refer to step 10 of Initial Installation in this section).

AC Power

Ensure that the AC Charge light is on. If not, plug the POET® IQ power cord into an AC receptacle. The power cord is not necessary for battery operation.

Gas Monitor

NOTE

- In the following steps, ensure that all Luer connectors are tight in order to prevent air leaks.

1. Make sure that the scavenger tube is connected properly and is not kinked (Refer to Initial Installation in this section).

⚠ WARNING ⚠

- Use only the Criticare-approved Water Chek™ water trap, Chek-Mate™ moisture filter, sample line, and scavenger line. The use of other brands may compromise patient care and monitor performance.

NOTE

- Criticare recommends changing the Water Chek™ and Chek-Mate™ weekly or as needed. Skip step 2 if a Water Chek™ less than one week old is already in place. Skip step 3 if a Chek-Mate less than one week old is in place.

Setup Procedures (For Each Use) (cont.)

2. Install the Water Chek™ water trap in the manifold as follows:

   a. Place the upper portion of the Water Chek™ under the upper hood of the manifold.

   b. Press upward on the bottom of the water trap to insure proper connection to the monitor.

   c. Snap the lower portion of the Water Chek™ into place (toward the monitor).

   If you will not be using a Chek-Mate™, leave the male Luer cap on the Water Chek™ in place and skip step 3 of this procedure.

3. Criticare recommends using the Chek-Mate™ with all cases. Install a Chek-Mate™ moisture filter as follows:

   a. Remove the Luer cap from the female Luer lock fitting on the Water Chek™.

   b. Connect the two Luer lock fittings of the Water Chek™ to the two Luer lock fittings on the Chek-Mate™ which do NOT have the white tag. (The fittings are gender-coded and the Chek-Mate™ line with the white tag will connect to the sample line).

NOTE

- Criticare recommends changing the sample line with each patient. If a used sample line is already connected, disconnect and discard it before using the monitor again.

4. Connect the female end of the sample line to the uncapped male connector on the Water Chek™ (or to the Chek-Mate™ line with the white tag, if being used).

5. Connect the sample line to the patient breathing circuit. If the breathing circuit or endotracheal tube has a built-in gas sampling port, connect the free end of the sample line to this point.

6. If the breathing circuit does not have a built-in gas sampling port, do **one** of the following:

   a. replace the elbow adaptor with one which has a gas sampling port (for example, Criticare Cat. No. 617), **or**

   b. add a straight endotracheal adaptor with the gas sampling port proximal or distal to the elbow (for example, Criticare Cat. No. 616).

Setup Procedures (For Each Use) (cont.)

NOTE

- Use an elbow endotracheal adaptor when minimal additional dead space is desired.

  For use with a nasal cannula, use a divided cannula (gas delivery/gas sampling) such as Criticare Cat. No. 628.

7. If you are using a heat-moisture exchanger (HME, or artificial nose):

   For best results, place the sample port distal to the HME (away from the patient). This allows the POET® IQ to sample dry gas rather than humidified gas, thus preserving the life of the Chek-Mate™ and/or Water Chek™. However, if a coaxial circuit such as a Baine Circuit is being used, this may dilute the sample with fresh gas, and cause inaccurate readings.

Pulse Oximeter *(models 602-3A, 602-3B, 602-4A, & 602-4B)*

Attach the pulse oximeter sensor to the POET® IQ monitor by plugging the electrical connector on the sensor cable to the connector marked SENSOR on the lower left side of the POET® IQ. Sensor connection to the patient is described in **Section 3 -- Operation.**

⚠ WARNING ⚠

- Use only Criticare-approved pulse oximeter sensors and cables. The use of other brands can injure the patient and/or damage the monitor.

ECG (UltraSync™) *(models 602-4A & 602-4B only)*

Perform the following steps to connect the ECG cable to the POET® IQ monitor:

1. If the ECG signal will be obtained from the external monitor:

   a. Connect the end of the special-order cable from Criticare with the standard ECG connector into the ECG receptacle on the lower left corner of the POET® IQ front panel. (Contact your local Criticare sales consultant if you do not have this cable.)

   b. Connect the other end of the cable to the high-level ECG output of the ECG monitor.

OR

2. If the ECG signal will be obtained directly from the patient, connect the ECG cable connector into the jack marked "ECG" on the lower left front panel of the POET® IQ. ECG lead wire connection and electrode placement is described in **Section 3 -- Operation.**

Section 3 — Operation

Operation

Once the setup procedures described in **Section 2 -- Getting Started** have been completed, the POET® IQ can be used to monitor a patient. This section provides a description of the following:

- Operator controls (keys on front panel)
- Turning on the monitor
- Patient connections
- Autocalibrations during operation
- Viewing patient data (waveform, numeric, and trend displays)
- Agent Identification and Quantification

Operator Controls

The POET® IQ was designed with the intention of making monitor operation as simple as possible. With few exceptions, all operator controls have a designated key on the front panel. The following paragraphs describe each key in the order in which it appears (from right to left) on the monitor.

Key Name		Function
Power	POWER	Press to turn the POET® IQ on or off.

Stand By

Standby modes are recommended for use between patients, in order to suspend alarm activity and trend data collection.

For all standby modes, SBY appears in place of numeric values for each function in standby. For modes in standby, the alarm limits displayed cannot be changed until those parameters are functioning again. When not in standby, the "- -" symbol indicates that a function is ready to operate. Displayed waveforms (or trends) corresponding to parameters in standby will remain displayed until the waveform (or trend) choice is changed. Those waveforms (or trends) will not be accessible again until that parameter is returned from standby.

STAND BY (cont.)

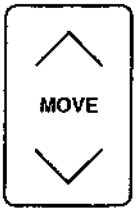
This switch toggles the pulse oximeter functions (SpO_2 and Pulse Rate) into or out of standby.

This switch toggles the gas monitor functions (CO_2, O_2, N_2O, agents, and respiration rate) into or out of standby.

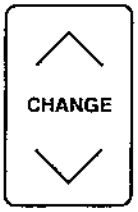
In units without a pulse oximeter (models 602-6A and 602-6B), a single STAND BY key is located in the SYSTEM group.

ADJUST Key Group

The function of these keys is dependent on the information currently being displayed. See the **Display**, **Alarms**, and **System** paragraphs in this section for details.



These keys move the cursor or highlighter in the Trend, Setup, and Set Limits screens.



These keys change the settings in the Set Limits and Setup screens. They also change the waveform and trend choices in the Wave and Trend screens, respectively.

DISPLAY Key Group

These keys control the format of displayed patient data. See **Viewing Patient Data** in this section for more details.

Displays waveforms on the upper portion of the screen and numeric data on the lower portion of the screen. Repeatedly pressing the WAVE key scrolls through various choices of waveforms. The CHANGE keys (^ and v) scroll through waveform choices in both directions. The MOVE keys (^ and v) are not active in this screen.

Scrolls through various vertical scale choices for CO_2 (all models) and plethysmograph (models 602-3A, 602-3B, 602-4A, & 602-4B).

DISPLAY Key Group (cont.)

NUMERIC

Displays large numeric values only (no waveforms) for all monitored parameters. The MOVE and CHANGE keys are not active in this mode.

TREND

Displays one of the following:

- Trend graphs on the upper part of the screen and real-time numeric data on the lower part of the screen (single-trend choices), **or,**
- Trend graphs on both the upper and lower parts of the screen (dual-trend choices).

Repeatedly pressing the TREND key scrolls through various single- and dual-trend choices. The CHANGE keys (∧ and ∨) scroll through trend choices in both directions, while the MOVE keys (∧ and ∨) move the time cursor on the graph. The MAGNIFY key zooms in and out of the time base view.

Press and hold the TREND key for three seconds to erase trends. (The POET® IQ will ask for confirmation before erasing.)

ALARMS Key Group

(Refer to **Section 4 -- Alarms and Status Messages** for more details.)

SET LIMITS

Displays real-time numeric data for all parameters (lower portion of screen), and upper and lower alarm limits for each parameter (upper portion of screen). The MOVE keys (∧ and ∨) move the cursor to highlight the next limit, while CHANGE keys (∧ and ∨) change the value of the highlighted limit. **Holding the SET LIMITS key for three seconds resets limits to factory default settings**, and deactivates smart alarms. (The POET® IQ will ask for confirmation before resetting.)

NOTE

- Alarm limits for each anesthetic agent are set independently (see **Section 4 -- Alarms and Messages**).

SILENCE

Disables the alarm audio for two minutes. (ALARM SIL is displayed on the screen

ALARMS Key Group (cont.)

during the alarm silence period.) If the monitor is already silenced, pressing the SILENCE key reactivates alarm audio. Pressing and holding the SILENCE key adjusts the alarm volume from level 0 to level 9, and plays a sample tone for each level. The alarm volume is set to the level displayed when the SILENCE key is released. If zero is chosen, AUDIO OFF is shown on the screen.

SYSTEM Key Group

SET UP

(See initial installation in **Section 2 -- Getting Started** for details.) Displays several items as follows:

- the status of various parameters relating to the pulse oximeter (if so equipped) such as average time.
- gas monitor information such as sample flow rate.
- alarm mode (staged or continuous).
- analog and digital output settings.
- time and date.

The MOVE keys (^ and v) move the cursor, while the CHANGE keys (^ and v) scroll through the choices for the highlighted parameter.

EVENT/ PRINT

Places an event marker on the trend screen (vertical dotted line). If digital output is configured for a printer, it also prints in the selected format (see **Appendix A -- Interfacing to External Devices** for details).

PULSE VOLUME

(models with pulse oximeter -- models 602-3A, 602-3B, 602-4A, & 602-4B) Toggles the audio tone produced with each detected pulse from the plethysmographic signal on and off. Holding the PULSE VOLUME key adjusts the pulse tone volume from 0 (off) to 9, and plays a sample tone for each level. Pulse volume is set to the level displayed when the PULSE VOLUME key is released.

STAND BY

(Units without pulse oximeter only -- Models 602-6A & 602-6B) Toggles all monitored

SYSTEM Key Group (cont.)

parameters (CO_2, O_2, N_2O, agents, and respiration rate) into or out of standby mode. SBY appears in place of numeric values when the unit is in standby mode. When not in standby, the "- -" symbol indicates that a function is ready to operate.

Exceptions to Designated Keys

There are situations when the function of the EVENT/PRINT and the CHANGE keys are labeled on the display screen. (Labels appear above the corresponding key inside a box.) For example, the DELAY label appears above the CHANGE key (^) during an autocalibration. These key functions are referred to in this manual where appropriate.

Turning On the Monitor

Press the POWER key to turn the monitor on. At this time, the screen will display "Criticare Systems, Inc." along with the model number, for about five seconds.

The display will then switch to the Wave or Numeric screen, whichever was selected when the unit was last used (the Numeric screen is the factory default).

NOTE

- The pulse oximeter is operable immediately upon switching from the "Criticare Systems, Inc." screen to the Wave or Numeric screen (models 602-3A, 602-3B, 602-4A, & 602-4B). The gas monitor requires a warm-up and auto calibration, as described in the following paragraphs, before it will function.

For the first minute, the infrared detectors will be warming up (the WARMING UP prompt will display on the screen). In the Wave screens which show a capnogram, the CO_2 graph will start at a maximum and decrease to zero during the 60 second warm-up period.

When the warm-up period is complete, the monitor will begin a 20 second autocalibration if the water trap and sample line are connected properly (see **Setup Procedures** in **Section 2 -- Getting Started**). If the water trap and sample line are not in place, the screen will display the message CONNECT SAMPLE LINE, and a CONTINUE label will appear above the CHANGE key (^). Press the CHANGE key (^) when the water trap and sample line are in place.

When the AUTOCAL IN PROGRESS message disappears, the gas monitoring portion of the POET® IQ is ready for operation.

Patient Connections

Gas Monitor

Patient connection for the gas monitor is described in Setup Procedures in **Section 2 -- Getting Started**, since this connection can usually be made before the patient enters the room.

Pulse Oximeter

(models 602-3A, 602-3B, 602-4A, & 602-4B)

⚠ WARNING ⚠

- Read the section on pulse oximetry safety in **Section 1 -- Introduction** before APPLYING sensors OR attempting use of the pulse oximeter function.

ADULT FINGER SENSOR PLACEMENT

The Adult Finger Sensor (Cat. No. 511) is recommended for short-duration monitoring applications. Depending on the size of the patient, the sensor should be applied to the finger that it fits most securely. The thumb, index and middle finger are used in most situations. (In some situations, the sensor is placed on a toe.)

1. Attach the finger sensor to the patient as shown in the following illustration. The cable should extend along the top of the patient's hand. If desired, sensor placement may be reinforced by taping the cable (not the sensor) to the hand or wrist.

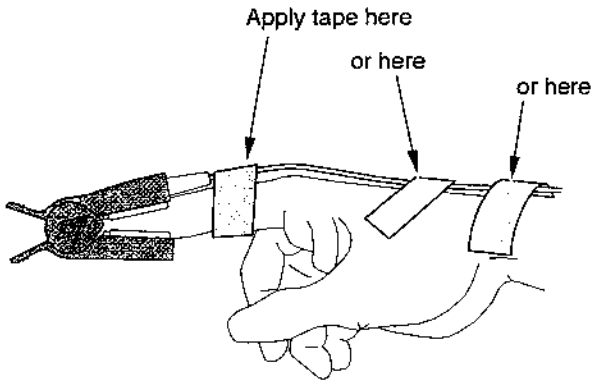


Figure 3-1. Placement of Tape for Finger Sensor

NOTE

- Do not apply tape to the sensor housing.

Patient Connections (cont.)

2. After several good pulses have been detected, the O_2 saturation and pulse rate values will appear on the display. If the unit fails to display data, check the sensor placement and connect and/or enable UltraSync (models 602-4A & 602-4B only) (refer to ECG information provided later in this section).
3. Refer to Operator Controls in this section for pulse volume adjustment.

NOTE

- For Multi-Site™ (Cat. No. 517) and disposable sensors (Cat. Nos. 570, 571, 572, or 573), see the instruction sheet that comes with the package.

ECG (Ultra-Sync™) *(models 602-4A & 602-4B only)*

If the ECG signal will be obtained directly from the patient, perform the following procedure. If the ECG signal will be obtained from an external ECG monitor, refer to the UltraSync™ information in the Setup procedures in **Section 2 -- Getting Started**.

⚠ WARNING ⚠

- Read the section on ECG safety in **Section 1 -- Introduction** before applying electrodes or attempting use of the ECG function.

1. Check the ECG cables for fraying or other deterioration. Replace worn cables.
2. Attach the lead wires to the patient cable.
3. Attach the electrodes to the lead wires.
4. Do the following before placing the electrodes:
   - To remove natural skin oils, wipe the patient's skin with alcohol before applying the electrodes.
   - Check the lead wires and cables periodically for frays and cracks. Discard if frays or cracks are present.
5. Place the electrodes on the patient. Electrode positions are shown in the illustration on page 3-9.

Patient Connections (cont.)

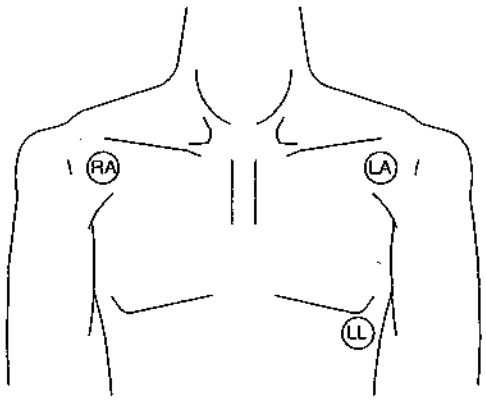


Figure 3-2. ECG Electrode Location.

If the electrodes don't adhere well, apply benzoin to the area before applying the electrodes. Benzoin helps prevent skin breakdown and enhances electrode adhesion.

⚠ WARNING ⚠

- Remove the electrodes once every 24 hours and examine the skin for irritation and breakdown. Apply clean electrodes to a different spot if necessary.

NOTES

- The UltraSync™ feature is dependent on a good quality ECG signal. Certain ECG patterns such as arrhythmias can reduce the ability of the pulse oximeter to obtain an SpO_2 reading.

- UltraSync™ can be disabled from the Setup screen (see Software Setup in **Section 2 -- Getting Started**).

- When the plethysmographic signal is synchronized with the ECG signal, the SYNC prompt will appear on the screen. This message also indicates that the Pulse reading is being obtained from the ECG signal (otherwise it is obtained from the plethysmographic signal).

Autocalibrations During Operation

The POET® IQ performs periodic autocalibrations during operation in order to assure accuracy of reported gas concentrations.

With the exception of start-up, all auto calibrations can be delayed by pressing the CHANGE key (^) below the DELAY prompt. If an autocalibration is delayed, the monitor will make another attempt in five minutes.

⚠ WARNING ⚠

- It is not recommended to DELAY any autocalibration more than two times, as this may reduce the accuracy of reported gas concentrations.

The following table describes the sequence and duration of autocalibrations during operation of the monitor:

Time Since Initial Warm-Up	Duration	Delayable	Comments
Immediate	20 sec.	No	First autocalibration
10 min.	15	Yes	
30 min.	20	Yes	
Every 3 hrs.	20	Yes	
As needed	15 or 20 sec.	Yes	Depends on ambient temperature change and internal electronics

Viewing Patient Data

The POET® IQ has three general formats for viewing patient data:

- Waveforms
- Numeric values only
- Graphic trends

Refer to the Operator Controls information in this section for an abbreviated description of these formats.

NOTE

- Although the Set Limits screen displays real time patient data, its primary function is to set alarm limits and is therefore not considered a display format.

The display format last used (waveform or numeric) will be the first format shown upon power-up (if the time and date are set).

Waveforms

Accessed by the WAVE key on the front panel, this display format shows various real-time waveform(s) on the upper portion of the screen, and real-time numeric values on the lower portion. A real-time clock is also displayed in the lower left corner of the screen in the absence of system messages (e.g., LOW BAT).

Once the Wave screen is entered, repeatedly pressing the WAVE key will scroll through the various waveform choices, and the CHANGE keys (∧ and ∨) scroll through the choices in both directions. The MOVE keys (∧ and ∨) are not active in the Wave screen.

The waveform(s) shown on the Wave screen will be the same as those selected the last time the Wave screen was displayed. (The factory default for each model is shown in the following paragraphs.)

The set of available waveform choices vary with each particular model as follows:

Basic gas monitor (models 602-6A & 602-6B)

1 CO_2 normal speed (factory default)

2 CO_2 normal and slow speed side by side

3 CO_2 normal speed and O_2 side by side

4 CO_2 normal speed and agent side by side

Waveforms (cont.)

Gas monitor with pulse oximeter (models 602-3A & 602-3B)

1 CO_2 normal speed and plethysmograph side by side (factory default)
2 CO_2 normal speed above plethysmograph
3 CO_2 normal speed
4 plethysmograph
5 CO_2 normal and slow speed side by side
6 CO_2 normal speed and O_2 side by side
7 CO_2 normal speed and agent side by side

Gas monitor with pulse oximeter and Ultra Sync™ (models 602-4A & 602-4B)

1 CO_2 normal speed and plethysmograph side by side (factory default)
2 CO_2 normal speed above plethysmograph
3 CO_2 normal speed
4 plethysmograph
5 CO_2 normal and slow speed side by side
6 ECG
7 ECG above plethysmograph
8 CO_2 normal speed above ECG
9 CO_2 normal speed and O_2 side by side
10 CO_2 normal speed and agent side by side

NOTE

- If waveforms are changed while any standby mode is active, waveforms associated with the parameters in standby can no longer be accessed until removed from standby.

ADJUSTING WAVEFORM GAIN

The gain (vertical scale) for the CO_2 and plethysmographic waveforms can be changed with the MAGNIFY key while those waveforms are displayed. O_2, agent, and ECG waveforms are autoscaled (the ECG waveform is accompanied by a one millivolt bar as an indication of vertical scale).

Waveforms (cont.)

Repeatedly pressing the MAGNIFY key will scroll through various waveform gains as described in the following paragraphs, depending on model number and which waveforms are currently displayed:

- CO_2 waveform only (all models)
  Toggles between 0-60 and 0-100 mmHg (or 0-7.5 and 0-12.5% or kPa)
- Plethysmograph waveform only (models 602-3A, 602-3B, 602-4A, & 602-4B)
  Scrolls among x1, x2, x5 gain
- CO_2 and plethysmograph waveforms (models 602-3A, 602-3B, 602-4A, & 602-4B) 0-60 mmHg for CO_2 and scrolls among x1, x2, x5 gain for the plethysmograph, then 0-100 mmHg for CO_2 and scrolls among x1, x2, x5 gain for the plethysmograph (if % or kPa is selected for CO_2 units, corresponding CO_2 scales will be 0-7.5 and 0-12.5% or kPa).

Numeric

This display format is accessed by the NUMERIC key on the front panel. It shows real-time, large numeric values for all parameters measured by the POET® IQ. No waveforms are available in this screen. A real-time clock is shown in the bottom left corner of the numeric screen in the absence of system messages.

The MAGNIFY, MOVE keys (∧ and ∨), and CHANGE keys (∧ and ∨) are not active in the Numeric screen.

Trends

The Trend display mode, which is accessed by pressing the TREND key on the front panel, shows graphic trends of up to 30 hours of previously recorded data for Anesthetic Agent, $ETCO_2$, O_2, Respiration Rate, SpO_2, and Pulse Rate.

NOTE

- Trend information is stored ONLY if the time and date are set before monitoring begins (see Software Setup in **Section 2 -- Getting Started** if the clock is not set).

Trend screens can be displayed in two formats:

- Trend graphs on the upper part of the screen and real-time numeric data on the lower part of the screen (single-trend choices), **or**,
- Trend graphs on both the upper and lower parts of the screen (dual-trend choices).

Trends (cont.)

In both formats, a real-time clock is shown in the lower left corner of the display screen in the absence of system messages.

Once the Trend screen is entered, repeatedly pressing the TREND key will scroll through the various trend display choices. The CHANGE keys (∧ and ∨) scroll through the choices in both directions.

The set of available Trend screens varies with each model as follows:

Basic gas monitor (model 602-6A & 602-6B)

1. End Tidal CO_2 ($ETCO_2$) (factory default)
2. Respiration Rate (RR)
3. Oxygen (O_2)
4. Anesthetic Agent (AGT)
5. $ETCO_2$ and AGT
6. O_2 and $ETCO_2$
7. AGT and RR

Gas monitor with pulse oximeter with and without UltraSync (models 602-3A, 602-3B, 602-4A, & 602-4B)

1. Oxygen Saturation (O_2 SAT) (factory default)
2. Pulse Rate (PR)
3. $ETCO_2$
4. RR
5. O_2
6. AGT
7. $ETCO_2$ and O_2 SAT
8. O_2 SAT and PR
9. $ETCO_2$ and AGT
10. O_2 and $ETCO_2$
11. O_2 and O_2 SAT
12. AGT and RR

NOTE

- If trends are changed while any standby mode is active, trends associated with the parameters in standby can no longer be accessed until removed from standby.

Trends (cont.)

DATA STORAGE TIME AND RESOLUTION

Trend data is collected at regular intervals for a given amount of memory time, as determined by the TREND setting in the Setup Screen. For example, the one hour trend will have a data point stored every second (for each parameter). The table below shows the available trend times, associated resolutions, and storage method (see Software Setup in **Section 2 -- Getting Started** for instructions to change settings):

Trend time	Resolution	Storage method
1 hr	Data every 1 sec	Avg. value over 1 sec
2.5 hr	Data every 5 sec	Min. & max. over 5 sec
5 hr	Data every 10 sec	Min. & max. over 10 sec
7.5 hr	Data every 15 sec	Min. & max. over 15 sec
15 hr	Data every 30 sec	Min. & max. over 30 sec
30 hr	Data every 1 min	Min. & max. over 1 min

If the trend memory is completely filled with data, the oldest data will be discarded as new data is collected.

NOTES

- 1, 2.5, and 5 hour agent trend shows only expired values. On all other trend time settings, agent trends show both inspired and expired values.

- Changing the TREND setting in the Setup screen erases the trend memory. Therefore it is recommended that the desired trend time/resolution be set before beginning a procedure.

ZOOM VIEW (TIME BASE)

For each trend time setting, the trend graph can be viewed in two time bases. For example, the 7.5 hour trend can be viewed with 7.5 hours on the screen all at one time (zoom-out view), or from any one hour segment within the 7.5 hours of data (zoom-in view).

The MAGNIFY key will toggle between zoom-in and zoom-out views.

When a trend is initially accessed, it is displayed in the zoom-in view, displaying the most recently recorded data. Prompts which show parameter(s) and amount of time being viewed will be displayed on the lower right corner of the screen at this time.

Trends (cont.)

SCROLLING THROUGH TREND MEMORY

The MOVE keys (^ and v) scroll through time in the trend memory (MOVE key [^] scrolls toward the most recently recorded data).

Once either MOVE key is pressed, a cursor will appear as a horizontal bar below the trend graph (in zoom-out view), or as a thin vertical solid line (in zoom-in view).

SCROLLING IN THE ZOOM-OUT VIEW

Once the MOVE keys (^ and v) are pressed to scroll through the trend memory in the zoom-out view, the lower right corner of the screen will show the date and time period represented by the cursor bar.

The width of the cursor bar below the trend graph in the zoom-out view is equivalent to a specified amount of time, depending on which resolution is currently selected in the TREND setting in the Setup screen (see table below):

Current TREND selection in Setup screen	**Cursor bar width is equivalent to**
1 hr	4 min
2.5 hr	20 min
5 hr	40 min
7.5 hr	1 hr
15 hr	2 hr
30 hr	4 hr

If MAGNIFY is pressed while the cursor bar is displayed in the zoom-out view, the display will zoom-in on the period covered by the cursor bar width. Move the cursor bar to the time period to be zoomed in on, then press MAGNIFY for a close view.

SCROLLING IN THE ZOOM-IN VIEW

Once the cursor appears in the zoom-in view (after pressing MOVE keys [^ and v] in this screen), the lower right corner of the screen will show a row of information regarding cursor position (date and time) and value(s) of the trend graph at the position of the cursor. Refer to the example on page 3-17.

Trends (cont.)

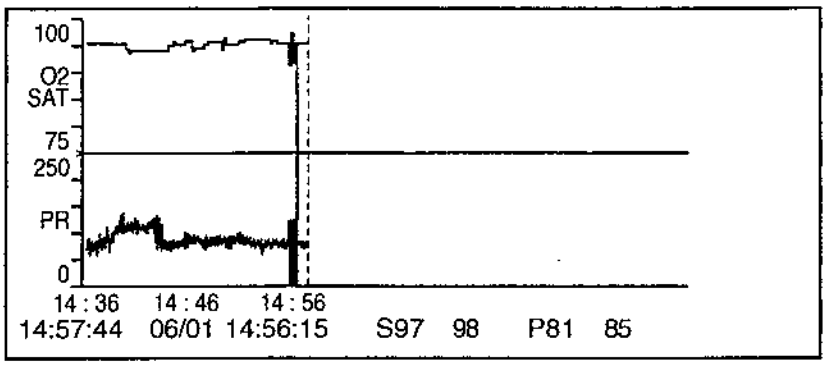


Figure 3-3. Explanation of display: (Dual trend of SpO_2 and pulse rate)

Displayed Value	Description
14:57:44	Current time
06/01	Date which data on cursor was recorded (month/day)
14:56:15	Time which data on cursor was recorded (hr:min:sec)
S97 98	Min and Max O_2 saturation value during time period of cursor
P81 85	Min and Max pulse value during time period of cursor

MARKERS ON TREND GRAPHS

EVENT MARKERS

When the EVENT/PRINT key is pressed during operation (in the Wave, Numeric, or Trend screen), the POET® IQ records the key press in the trend memory. The event is displayed on the trend graph at the appropriate time as a thin dotted vertical line.

ALARM MARKERS

A violation of any alarm limit (as set in the Set Limits screen) will be recorded in the trend memory. It will then be displayed on the trend graph at the appropriate time as a narrow line along the horizontal (time) axis of the graph.

Trends (cont.)

POWER-UP MARKERS

A column of diamonds will appear on the trend graph to represent each time the monitor is powered on. A maximum of eight power-up segments may be retained in memory. If eight power-up segments are already recorded, each new power-up segment which is recorded will cause the oldest one to be erased. All power-up segments in memory can be accessed by the cursor (MOVE keys).

NOTE

- The POET® IQ does not add space on the trend graphs to represent the time when the monitor is off. The only indication that the monitor was off is the column of diamonds shown on the graph.

CLEARING THE TREND MEMORY

The entire trend memory can be cleared in two ways:

1. Press and hold the TREND key on the front panel for three seconds. The prompt ERASE TRENDS? will appear on the lower portion of the screen, and a YES (^) or NO (v) choice will appear above the CHANGE keys (^ and v). Press CHANGE key (^) to clear the trend memory, or press CHANGE key (v) to cancel.
2. Changing the trend time•resolution setting, CO_2 mode, or time/date in the Setup screen (TRENDS selection) will erase the trend memory. Confirmation will not be requested.

Anesthetic Agent Identification and Quantification

The POET® IQ is an agent-specific monitor, which means that it is capable of simultaneously distinguishing between and quantifying various halogenated anesthetic agents.

The agents which can be identified and simultaneously quantified at any given time are halothane, enflurane, isoflurane, desflurane, and sevoflurane.

(models 602-3A, 602-4A, or 602-6A only)

The set of three agents which can be identified and simultaneously quantified at any given time is selectable from the Setup screen. The set choices are:

- For Desflurane agent set, HAL/ENF/ISO or HAL/DES/ISO
- For Sevoflurane agent set, HAL/ENF/ISO or HAL/SEV/ISO

The currently selected agent set is displayed in all screens except the Trend screen.

⚠ WARNING ⚠

- If any anesthetic agent other than those specified in the currently selected agent set is present, it will be misidentified and may interfere with reported agent concentrations.

Automatic Agent Identification

When an agent included in the currently selected agent set is above its identification threshold (see Specifications in **Section 1 -- Introduction**), the AGT label on the display will automatically change to the appropriate agent label (HAL, ENF, ISO, DES, SEV). The agent label will flash for 10 seconds following a change in status.

Mixed Anesthetic Agents

If more than one agent is detected, the flashing MIX label will replace the previous label, and an audio alarm will sound (this is considered a system alarm).

During a mix condition, inspired and expired values for all agents are displayed in the Wave, Single Trend, Numeric, and Set Limits screens. A secondary agent is considered part of a mix if each agent is above its mix threshold as described in the Specifications (**Section 1 -- Introduction**).

Section 4 — Alarms and Status Messages

Alarms

General

The POET® IQ has audible and visual alarms for physiological parameters as well as status of the system. When the value of a parameter falls outside of its limits (as shown in the Set Limits screen), an audio tone sounds, and the parameter flashes in reverse video on the Wave, Numeric, Single Trend, and Set Limits screens. Only the audio alarm sounds in the Setup and Dual Trend screens. In the Zeroing and Full Calibration screens, no alarms are active.

If more than one parameter is alarming at the same time, all parameters in violation will flash simultaneously.

Entering the Set Limits screen during an alarm condition will highlight the violated limit of the alarming parameter, allowing that limit to be set immediately.

Alarm Activation

Alarms for gas monitoring parameters are activated upon detection of the second breath after power-up or returning from gas standby. For pulse oximeter parameters, alarm activation occurs shortly after the first accepted pulse (when the SpO_2 reading appears) after power-up or returning from oximeter standby. System alarms are active immediately upon power up or returning from oximeter standby (for example, SENSOR).

NOTE

- Some messages (such as APNEA and SENSOR) will appear prior to alarm activation, without audio and without flashing. They are removed when corresponding alarms are activated.

Audio

STAGED VS. CONTINUOUS

The audio portion of both physiologic and system alarms can be either a continuous tone upon violation, or a staged series of tones (one tone upon violation, two tones twenty seconds later, continuous tone twenty seconds later). This choice can be set in the Setup screen. (See Software Setup in **Section 2 -- Getting Started.**)

Audio (cont.)

TEMPORARY SILENCE

All audio alarms can be **silenced for two minutes** by pressing the SILENCE key. During this alarm silence period, the ALARM SIL message is displayed on the lower part of the screen. The alarm silence condition is cancelled automatically after 2 minutes, or upon pressing SILENCE again. Alarm limits which are violated after SILENCE is activated will sound two tones one time upon violation.

⚠ WARNING ⚠

- Do not silence the alarms in situations where patient care may be compromised.

PERMANENT SILENCE

All audio alarms can be turned off by pressing and holding the SILENCE switch. The lower part of the screen will first display the current alarm volume level, and will then show zero (release the SILENCE switch at this time). While the alarm audio is off, the AUDIO OFF message will be displayed on the lower portion of the screen. Upon power up, the alarm audio will always be on.

⚠ WARNING ⚠

- Do not silence the alarms in situations where patient care may be compromised.

VOLUME ADJUSTMENT

There are ten volume levels, 0 through 9, to which the alarm audio can be set. To choose the desired volume level, press and hold the SILENCE switch. The lower part of the screen will first display the current alarm volume level, and will then scroll from 0 through 9. For each level, a sample audio tone will sound at the appropriate volume. Release the SILENCE switch when the desired volume is reached.

⚠ WARNING ⚠

- Do not set the alarm volume so low that it is inaudible in situations where patient care may be compromised. Be sure that you can hear it above the ambient noise. Note that 0=OFF.

Audio (cont.)

Upon power up, if the alarm volume was previously set below three, the volume will be set to three, otherwise the previous setting will be retained (even if the unit is unplugged).

PHYSIOLOGIC VS. SYSTEM ALARMS

Physiologic alarms generate a single-pitch alarm tone, while system alarms generate a dual-pitch tone which alternates two times per second, and sounds once every two seconds.

PITCH ADJUSTMENT

The audio pitch for Physiologic Alarms can be adjusted in the Setup screen (see Software Setup in **Section 2 -- Getting Started**).

Adjusting Alarm Limits

Alarm limits can be changed from the factory-set default values as follows:

- Press the SET LIMITS key (upper and lower alarm limits for each parameter will be displayed on the upper portion of the screen).
- Use the MOVE keys (∧ and ∨) to highlight the desired limit of the parameter to be set.
- Once the desired limit is highlighted, use the CHANGE keys (∧ and ∨) to change the limit to the desired value.

NOTE

- If no adjustments are made within 60 seconds in the Set Limits screen (or 60 seconds after the last adjustment), the display automatically changes to the last selected waveform choice.

With the exception of low SpO_2, all limits will be retained in memory even if the unit is powered down or unplugged (if the time and date are set).

Upon power up, low SpO_2 is automatically set to 85 if it was set below 85 during the previous use. Otherwise, it is set to the previous value.

SETTING ANESTHETIC AGENT ALARM LIMITS

Alarm limits for anesthetic agents are set independently for each agent. In the Set Limits screen, the MOVE keys (∧ and ∨) scroll through inspired and expired, high and low limits for each agent. Limits for only one agent are displayed at any given time.

Resetting Alarm Limits to Default Values

To reset all alarm limits to factory default settings, press and hold the SET LIMITS key for three seconds. At this time, the message RESET LIMITS? will appear together with a YES, NO choice above the CHANGE keys (∧ and ∨). Press YES (CHANGE ∧) to reset limits to the default values, or NO (CHANGE ∨) to cancel.

Smart Alarms

In the POET® IQ, Smart Alarms is a feature in which the alarm limits for $ETCO_2$, SpO_2, and Pulse Rate are automatically adjusted based upon the patient's baseline values for those parameters. When Smart Alarms mode is activated, upper and lower alarm limits are automatically set as follows:

Parameter	Patient's Baseline Value	Lower Smart Limit = Baseline Minus:	Upper Smart Limit = Baseline Plus:
$ETCO_2$	0-39 mmHg	5mmHg	5 mmHg
	40-99 mmHg	8 mmHg	8 mmHg
SpO_2	0-100%	5%	5%
Pulse Rate	0-89 bpm	10 bpm	10 bpm
	90-139 bpm	15 bpm	15 bpm
	140-250 bpm	20 bpm	20 bpm

To activate the Smart Alarms mode:

- Press the SET LIMITS key (alarm limits will be displayed)
- Press the EVENT/PRINT key below the SMART SET legend on the screen
- Smart Alarm limits can be overridden at any time by following the procedure to set alarm limits, described previously in this section.

The monitor must be displaying data for those parameters which have Smart Alarms, in order to activate Smart Alarms.

To deactivate the Smart Alarms mode:

- Once the POET® IQ is in Smart Alarms mode, the SMART RESET legend is shown above the EVENT/ PRINT key in the Set Limits screen. Press this key to exit Smart Alarms mode. (Limits will reset to previous values before Smart Alarms were activated.)

NOTE

- The SMART RESET and RESET ALARMS keys are independent and may appear on the same screen simultaneously.

Physiologic Alarms

	Alarm	Limit Range (factory defaults shown in **bold**)
Gas Monitor	Apnea	5-55 sec (**20 sec**)
	Respiration Rate	
	High	0-99/min, off (**35/min**)
	Low	Off, 0-99/min (**4/min**)
	Anesthetic agents	
	Halothane	
	High expired	0.1-5.0% (**1.5%**)
	Low expired	off, 0.1-4.9% (**off**)
	High inspired	0.1-5.0%, (**2.3%**)
	Low inspired	off, 0.1-4.9% (**off**)
	Enflurane	
	High expired	0.1-5.0% (**3.2%**)
	Low expired	off, 0.1-4.9% (**off**)
	High inspired	0.1-5.0% (**4.8%**)
	Low inspired	off, 0.1-4.9% (**off**)
	Isoflurane	
	High expired	0.1-5.0% (**2.4%**)
	Low expired	off, 0.1-4.9% (**off**)
	High inspired	0.1-5.0% (**3.6%**)
	Low inspired	off, 0.1-4.9%, (**off**)
	Sevoflurane	
	High expired	0.1-7.0% (**3.4%**)
	Low expired	off, 0.1-6.9% (**off**)
	High inspired	0.1-7.0% (**5.1%**)
	Low inspired	off, 0.1-6.9% (**off**)
	Desflurane	
	High expired	0.1-18.0% (**12.0%**)
	Low expired	off, 0.1-17.9% (**off**)
	High inspired	0.1-18.0% (**18.0%**)
	Low inspired	off, 0.1-17.9% (**off**)

NOTE

- Factory default high agent limits correspond to MAC levels in O_2 as follows: Expired 2 MAC / Inspired 3 MAC.

Physiologic Alarms (cont.)

Nitrous Oxide (N_2O)		
	High expired	1-99%, off (**off**)
	Low expired	off, 1-99% (**off**)
	High inspired	1-99%, off (**75%**)
	Low inspired	off, 1-99% (**off**)
Carbon dioxide (CO_2)		
	High end tidal	31-99mmHg, off (**55** mmHg)
	Low end tidal	off, 1-99mmHg (**5** mmHg)
	High inspired	1-24mmHg, off (**10** mmHg)
	Low inspired	off, 1-24mmHg (**off**)
Oxygen (O_2)		
	High expired	1-99%, off (**off**)
	Low expired	off, 1-99% (**off**)
	High inspired	19-99, off (**off**)
	Low inspired	18-99% (**18%**)

Pulse Oximeter

Pulse		
	Low	off, 20-200 bpm, off (**40 bpm**)
	High	20-250 bpm, off (**180 bpm**)
SpO_2		
	Low	
	Adult mode	off, 50-99% (**90%**)
	Neonatal mode	off, 0-99% (**90%**) (If off, LOSAT OFF is displayed on screen)
	High	off, 70-99% (**off**)

NOTE

- Upper limit cannot be set lower than lower limit, and vice versa.

System Alarms

SPO_2 SEARCH AND PULSE SEARCH
Alarm when pulse oximeter does not receive an acceptable pulse for time specified in Setup screen under SEARCH TIME (see Software Setup in **Section 2 -- Getting Started**). Pulse search will only appear during this condition on models 602-4A and 602-4B, and if an acceptable pulse is not sensed from the ECG signal.

System Alarms (cont.)

Gas Monitor

MIX

A mixture of anesthetic agents is identified (see Specifications in **Section 1 -- Introduction** for thresholds). For models 602-3A, 602-4A, and 602-6A, the three agents currently selected are simultaneously quantified during a mix.

OVERPRESSURE REMINDER

Three short beeps every two minutes signal that the inspired agent concentration exceeded (for more than three minutes) the corresponding threshold as shown below. During this reminder, the agent label flashes on and off. The thresholds are not operator programmable and correspond to 2.5 MAC in O_2.

If Agent Identified is:	Non-programmable threshold is (%):
HAL	1.9
ENF	4.0
ISO	3.0
DES	15.0
SEV	4.3

Pulse Oximeter

HIGH AMBIENT

Ambient light or noise is detected by the photodetector in the pulse oximeter sensor. Use a towel or other opaque material to shield the sensor from outside light sources such as sunlight, infrared heat lamps, and phototherapy lamps.

SENSOR

Too much light is being detected by the photodetector in the pulse oximeter sensor. This is usually caused by one of two conditions:

- the sensor has fallen off the patient, or
- a monitoring site with greater tissue density is required (the tissue is too thin)

SENSOR SIGNAL

Not enough light is being sensed by the photodetector in the pulse oximeter sensor. This is usually caused by one of three conditions:

- the sensor is not connected to the monitor
- a monitoring site with lower tissue density is required (the tissue is too thick), or
- the sensor is malfunctioning

System Alarms (cont.)

Miscellaneous

LOW BATTERY

The battery power will last approximately 15 minutes once this message first appears.

Status Messages (No Audio)

Gas Monitor

AUTOCAL IN PROGRESS

The gas monitor is performing automatic zero calibration (all gas monitoring functions are suspended).

CONNECT SAMPLE LINE

The water trap and/or sample line are not connected. The monitor cannot perform automatic calibration, and all gas monitoring functions are suspended. Press CONTINUE (CHANGE [^]) when the trap and line are in place.

REPLACE TRAP

The water trap is full or occluded. This message appears only after attempting to automatically clear the occlusion five times or after sixty seconds of continuous occlusion. Press CONTINUE (CHANGE [^]) when the trap and line are in place.

WARMING UP

The gas monitor is heating up to operating temperature. No gas monitoring functions are active until the unit is warmed up (this takes about 1 minute). During the warm-up period, the capnograph shows a gradually decreasing waveform. When the capnograph reaches zero, the system performs an autocalibration. Note that the pulse oximeter is active during the warming-up phase.

Pulse Oximeter

(models 602-3A, 602-3B, 602-4A, & 602-4B)

LOSAT OFF

Low SpO_2 alarm limit is set to OFF (this message does not display if the alarm audio is turned off).

LO PLETH

The plethysmographic (pulse) signal from the pulse oximeter is weak due to low perfusion or low pulse pressure. Displayed SpO_2 value is held from last reading, and SpO_2 prompt flashes.

Status Messages (No Audio) (cont.)

Miscellaneous

SYNC (models 602-4A & 602-4B only)

The plethysmograph is in sync with the ECG signal (UltraSync is active). Also, when this message is present, the Pulse reading is being obtained from the ECG (otherwise it is obtained from the pulse oximeter).

ECG (models 602-4A & 602-4B only)

When oximeter is not in use or is non-functional, the pulse reading will come from the ECG signal.

ALARM SIL

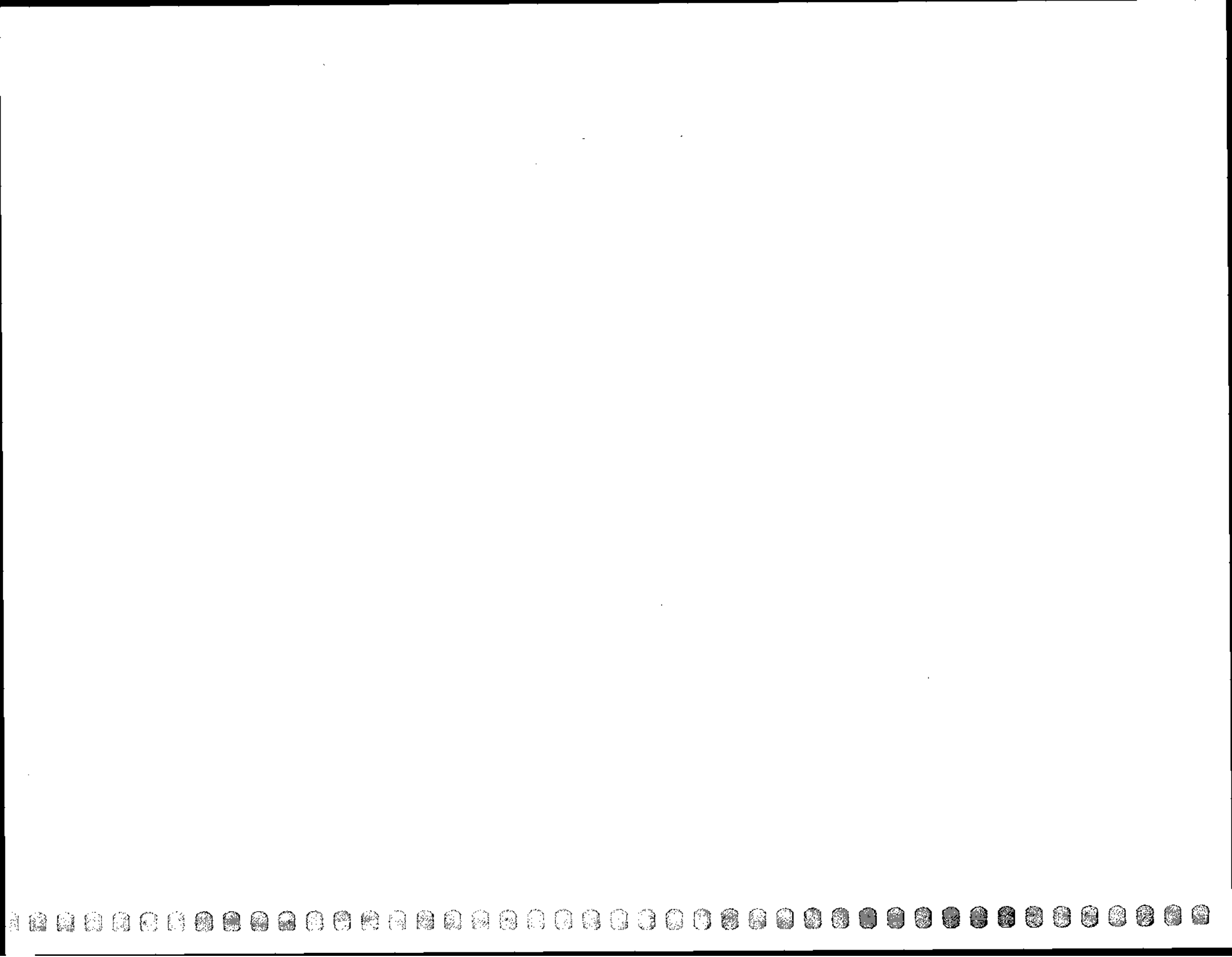
Alarm audio has been temporarily silenced for two minutes.

AUDIO OFF

Alarm audio has been turned off (alarm volume is set to zero).

SYSTEM FAULT (followed by a specific message)

There is a system malfunction. Note the specific message that accompanies the System fault message, and refer to the POET® IQ Service Manual or call Technical Support at 1-800-458-2697.



Section 5 — Maintenance

Maintenance Schedule

Every Patient	• Change the sample line • Change the endotracheal adapter • Clean the pulse oximeter sensor (unless it is a disposable sensor) • Clean the ECG cable and leads
Every Day	• Inspect the scavenger hose for proper connection and kinks
Every Week	• Change the Water Chek™ (water trap) • Change the Chek-Mate™ (filter)
Every Month	• Inspect pulse oximeter sensors and cables for damage • Inspect the ECG cables and leads for damage
Every 3 Months	• Clean the exterior of the unit (or clean as needed)
Every 6 Months	• Check the O_2 cell (change and adjust response if needed)
Every Year	• Check the CO_2 absorber (change if needed; change at least every 3 years) • Verify the automatic calibration (perform calibration only if needed) • Perform manual calibration

Cleaning and Disinfecting

⚠ WARNING ⚠

- Turn the power off before cleaning the monitor or sensor. Never immerse the monitor in liquids. Sever electrical shock could result.

⚠ CAUTION ⚠

- Do not use abrasive cleaners. Abrasive cleaners can damage the POET® IQ monitor.

Exterior Surfaces

The exterior surface of the POET® IQ monitor may be wiped clean with alcohol.

Display and Glare Reduction Screen

To remove the glare reduction screen for cleaning, pry it with a small screwdriver in the notch on the top center of the screen.

To clean the glare reduction screen, wipe it with a clean, soft, lint-free cloth sprayed with glass cleaner.

⚠ CAUTIONS ⚠

- The glare reduction screen should be removed and replaced as infrequently as possible to prevent scratching the surrounding bezel. When removing or replacing the screen, be careful not to let it scratch the surrounding bezel.

- Do not use alcohol or abrasive cleaners on the glare-reduction screen. Use of these cleaners may reduce the effectiveness of glare reduction. Use only ordinary glass cleaners only.

- Use only a soft, clean, lint-free cloth. Paper towels or tissues can scratch the surface and reduce the effectiveness of the glare reduction screen.

Cleaning and Disinfecting (cont.)

To clean the display screen, wipe it with a clean, soft, lint-free cloth sprayed with glass cleaner.

To replace the glare-reduction screen, slide one end (left or right) into place, flex the screen slightly, then allow the other end to slide in (be sure that the glare reduction surface faces outward).

Pulse Oximeter Sensors
(models 602-3A, 602-3B, 602-4A & 602-4B)

FINGER SENSOR

The finger sensor may be wiped clean with alcohol. The surface of the sensor LED's and photodetector may also be cleaned with alcohol. Dry the surface with a clean dry cloth.

⚠ CAUTION ⚠

- Do not immerse the finger sensor in liquids. Doing so may damage the sensor.

Multi-Site™ SENSOR

The Multi-Site Sensor (Cat. Nos. 517 or 917) may be disinfected in a 2% glutaraldehyde solution. Place only the sensor paddles and cable in the solution.

⚠ CAUTION ⚠

- Do not place the Multi-Site connector in the solution. Doing so may damage the connector.

ECG Cables and Leads
(models 602-4A & 602-4B only)

The ECG cable and leads may be cleaned with alcohol.

NOTE

- Check the ECG lead wires and cables, sensor cables and power cords periodically for frays and cracks. Discard if frays or cracks are present.

Verifying the Automatic Calibration

Criticare Systems, Inc. recommends that the automatic calibration be verified annually, or as recommended by your institution's quality assurance program.

Before Beginning

If the POET® IQ has been in temperatures below 15° C (59° F), allow it to sit at room temperature for 30 minutes before checking the accuracy.

NOTE

- If you would like assistance during this procedure, call Technical Support at 1-800-458-2697.

Procedure

1. Install a Water Chek™ water trap and sample line as follows (do not use components previously used on a patient):
   - Place the upper portion of the Water-Chek™ under the upper hood of the manifold.
   - Press upward on the bottom of the water trap to insure proper connection to the monitor.
   - Snap the lower portion of the Water-Chek™ into place (toward the monitor).
   - Leave the male Luer cap on the Water-Chek™ in place.
   - Connect the female end of the sample line to the uncapped male connector on the Water-Chek™.
2. Press the POWER key to turn the POET® IQ on.

Aerosol gas cylinders with the following mixtures are available from Criticare:

Cat. No.	CO_2	N_2O	Agent	Balance
631	5%	60%	1% Isoflurane	Nitrogen
634	5%	60%	1% Enflurane	Nitrogen
635	5%	60%	1% Halothane	Nitrogen
656	0%	0%	4% Desflurane	Nitrogen
636	0%	0%	1% Sevoflurane	Nitrogen

3. After warm-up and autocal (approximately 80 seconds), connect the free end of the sample line to a cal gas cylinder (the connection tubing is located in the cap). The order in which the cylinders are sampled is not important.

Verifying the Automatic Calibration (cont.)

4. Press and hold the nozzle on the cylinder. After the AGT label switches to the appropriate agent label, compare the inspired values for N_2O, O_2, and agent to the acceptable ranges shown in the following table.

Gas	Acceptable Range (%)
N_2O	55-65
O_2	0-1
Agent	0.8-1.2 for ISO, HAL, or ENF 6.7-7.3 for DES 1.8-2.2 for SEV

5. To obtain a CO_2 reading, periodically pulse the nozzle to simulate breaths (approx. 3 sec. on and 3 sec. off). Take the CO_2 reading after the expired value is updated twice on the display. (The first breath is not N_2O compensated.) Since the POET® IQ displays CO_2 in either mmHg, kPa, or %, and the reading is dependent on local barometric pressure, use the following table to determine the acceptable CO_2 reading. (Compare the table values to the expired CO_2 value on the POET® IQ display.)

Local read: Barometric Pressure, mmHg	Expired CO_2 on POET® IQ should read: mmHg	kPa	%
610-629	29-33	3.8-4.4	4.7-5.3
630-649	30-34	3.9-4.6	4.7-5.3
650-669	31-35	4.1-4.7	4.7-5.3
670-689	32-36	4.2-4.8	4.7-5.3
690-709	33-37	4.4-5.0	4.7-5.3
710-729	34-38	4.5-5.1	4.7-5.3
730-749	35-39	4.6-5.2	4.7-5.3
750-769 (Sea level)	**36-40**	**4.7-5.4**	**4.7-5.3**
770-789	37-41	4.9-5.5	4.7-5.3

6. Repeat steps 4 and 5 for the other cylinders which contain the other agents.
7. Allow the POET® IQ to sample room air. The indicated O_2 concentration should be between 20 and 22%.
8. If any gas concentrations shown on the display are out of range during this procedure, perform a manual calibration as described next in this section. If displayed concentrations are within range, do not calibrate the POET® IQ.

Manually Calibrating the POET® IQ

⚠ CAUTION ⚠

- This procedure should be performed only for the gases shown to be out of range as specified in the verification procedure. If you are not sure about the results, please call Technical Support at 1-800-458-2697.

Before beginning, the POET® IQ should:

- Have a Water Chek™ and sample line (not previously used on a patient) in place
- Be at room temperature with the power on for at least 5 minutes. (If the POET® IQ has been in temperatures below 15° C [59° F], allow it to sit at room temperature for 30 minutes before beginning.)

Procedure

The calibration procedure is as follows:

1. Press and hold the SETUP key for five seconds. The POET® IQ will display:

Calibration Mode

Performing Zero Cal
Please wait . . . .

2. After the zero cal (approximately 20 seconds), press YES (the CHANGE key ^) to enter the Full Cal screen. The screen displays the following:

Calibration Mode

CO2 mmHg	O2%	N2O%	AGT%
0.0	21	0	0.0

— OR —

Calibration Mode

CO2 (% or KPA)	O2%	N2O%	AGT%
0.0	21	0	0.0

3. Connect the free end of the sample line to a calibration gas cylinder which contains a gas previously shown to require calibration (out of range as specified in the verification procedure).

⚠ WARNING ⚠

- Use only Criticare (or Criticare approved) calibration gases. Accuracy with the use of other brands is not guaranteed.

NOTE

- The connection tubing for the aerosol cal gas is located in the cap.

4. Press and hold the nozzle on the aerosol can to allow the monitor to sample the gas from the cylinder.

NOTE

- If the oxygen reading on the display is above 2%, check pneumatic connections before continuing.

Procedure (cont.)

5. After the readings have stabilized for at least 5 seconds, (and the anesthetic agent is identified) press EVENT/ PRINT to lock the numbers, then release the gas nozzle.
6. Press the MOVE key (^) to highlight any gas that requires calibration. When the gas is highlighted, use the CHANGE keys(^ and v) to adjust the reading until it matches the corresponding cylinder reading (see the following table for proper CO_2 reading). (Repeat this step for each gas which was out of specifications).

Local Barometric Pressure, mmHg	**Adjust CO_2 Reading to: mmHg**
610-629	31
630-649	32
650-669	33
670-689	34
690-709	35
710-729	36
730-749	37
750-769 (Sea level)	**38**
770-789	39

7. After making all necessary adjustments, press EVENT/ PRINT. Repeat steps 4 through 7 for the other cylinder(s) if necessary.

NOTE

- If CO_2 or N_2O were adjusted with the first cylinder used, it is not necessary to make additional adjustments using the other cylinders.

8. At this point if O_2 does not show 20 - 22%, repeat steps 5 through 7 using room air as the calibration gas.
9. Exit the calibration mode by pressing either the WAVE, TREND, NUMERIC, or SET LIMITS key.

⚠ WARNING ⚠

- After calibrating, check accuracy by running a known gas through the monitor. This is absolutely necessary to verify that the calibration procedure was performed properly.

Replacing the O_2 Cell

Although the life of the galvanic oxygen cell can vary from three months to two years, average lifetime is six to twelve months. Criticare Systems, Inc. recommends checking the cell every six months and changing it as needed.

NOTE

- If you would like assistance during this procedure, please call Technical Support at 1-800-458-2697.

To change the oxygen cell, perform the following procedure:

1. With the POET® IQ power off, remove the protective cover from the back panel (two quarter turn screws). Refer to Visual Description of the rear panel in **Section 1 -- Introduction**).
2. Unplug the electrical connector from the cell, and unscrew the cell (counter clockwise) from the aluminum block on the rear panel of the POET® IQ.
3. Screw a new oxygen cell hand-tight into the aluminum block on the rear panel.

⚠ CAUTIONS ⚠

- Use only Criticare Cat. No. 644 O_2 cell. Use of other O_2 cells may compromise instrument performance.
- Do not overtighten the oxygen cell into the block. Overtightening can damage the cell, and/or the rubber seal, and cause a pneumatic leak in the system.

4. Before attaching the electrical connector, turn the POET® iQ power on. When the display reads "O_2 cell inoperable", turn off the monitor, attach the electrical connector to the new cell, and replace the protective cover.

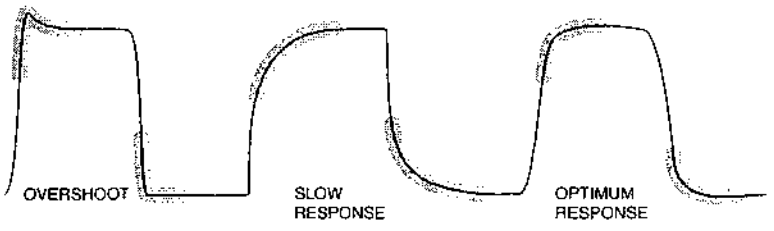
⚠ WARNING ⚠

- Before using the POET® IQ, adjust the O_2 response (see next page), otherwise, inaccurate O_2 values may be reported.

Adjusting the O_2 Response

The following procedure describes the oxygen response adjustment which is necessary before using the POET® IQ, every time the oxygen cell is changed.

1. With a water trap and sample line in place, turn the power on.
2. After warm-up and autocal, hold the SETUP key for five seconds. The POET® IQ will begin to perform a zero cal.
3. During the zero cal, press STAND BY (on models 602-6A & 602-4B) or PULSE VOLUME (on models 602-3A, 602-3B, 602-4A, or 602-4B), then press YES (the CHANGE key [∧]) at the DO O_2 SETUP? prompt.
4. Oxygen wave and the prompt COMP 0 will appear. Press the CHANGE key (∨) twenty times, then press the MOVE key (∧) to switch to COMP 1. Press the CHANGE key (∨) twenty times again, then switch back to COMP 0 (by pressing the MOVE key [∧]).
5. Allow the POET® IQ to sample any Criticare calibration gas, and pulse the gas approximately three seconds on and three seconds off.
6. Adjust the CHANGE keys (∧ and ∨) (start with the CHANGE key [∧]) until the waveform looks as close as possible to the optimum response waveform in the diagram below (adjust for the fastest response with no overshoot).



= **Observe waveform response in these areas**

7. Press the MOVE key (∧) to display COMP 1, and repeat steps five and six. This will square off the corners of the waveform to provide the optimum response.

Adjusting the O_2 Response (cont.)

8. Switch between COMP 1 and COMP 0 to get the fastest response with no overshoot and the least amount of noise on the oxygen waveform (adjust COMP 1 down to minimize noise).
9. Press WAVE to exit the oxygen setup screen.

Checking/Replacing the CO_2 Absorber

The CO_2 absorber canister is located under the same protective cover as the oxygen cell on the back panel. It is used to assure that there is no CO_2 in the gas sample during autocalibrations. The absorber canister will need to be changed when it is exhausted, and the absorber granules will turn blue when this occurs (the color can be viewed through the window in the protective cover).

Criticare Systems, Inc. recommends replacing the CO_2 absorber canister every three years or as needed. To change the canister:

1. Remove the protective cover from the back panel (two quarter turn screws).
2. Remove the canister from the holder, and remove the two tubes which connect to the canister.
3. Replace the tubes onto a new CO_2 absorber canister (use **only** Criticare Cat. No. 643)
4. Replace the canister in the holder, and replace the protective cover (no calibration is necessary).

Battery Storage/ Replacement

Remove the battery from the monitor if the unit will be stored for longer than 90 days.

Appendix A — Interfacing to the POET® IQ

Interface Parameters

To interface your POET IQ monitor to an external device, it is necessary to match the interface parameters on the monitor to those of the device.

The interface parameters are:

- **Baud rate**

  The speed at which data is transferred from the monitor,

- **Protocol** (worded on Setup screen as PORT MODE)

  The mode in which data is transferred, and

- **Serial interval** (worded on Setup screen as PORT TIME)

  The time interval the POET IQ will wait between transferring complete data packets.

Similar parameters may also need to be set on the external device. Each subsection in this section explains how to set these parameters appropriately for each specific device being interfaced with the POET IQ.

To change settings on the POET IQ:

- Press the SETUP key on the front panel
- Use the MOVE keys (▲ and ▼) to highlight the parameter to be set
- Use the CHANGE keys (▲ and ▼) to scroll through the selections

Printing with an External Printer

The POET IQ monitor is designed to use serial (RS-232C) ASCII printers with Epson MX graphics emulation. Printers that support this graphics mode include: the Epson FX series, the Hewlett-Packard ThinkJet, and the Diconix 150s and 180si. If the printer supports ASCII printing but not the FX graphics mode, it is still possible to print text data (the ASCII format) from the POET IQ.

Printing with an External Printer (cont.)

Computer Interface Pinouts

The following is a pinout for the Computer Interface output.

PIN	SIGNAL
2	RS-232 OUT
3	RS-232 IN
7	COMMON
22	RS-422 OUT (-)
23	RS-422 OUT (+)
24	RS-422 IN (+)
25	RS-422 IN (-)

The serial printer must be connected to the POET IQ with the appropriate cable. Most serial printers with an RS-232 interface will use a standard serial printer cable. However, first check the printer manual for the pinout. Look for:

PIN 2 RS-232 OUT (transmits data to the monitor)

PIN 3 RS-232 IN (receives data from the monitor)

PIN 7 COMMON (or GROUND, or SIGNAL GROUND, SERIAL GROUND, etc.)

If the printer does not use these pins, a custom cable is required. (Ask your Criticare sales representative.)

Criticare equipment does not support hardware handshaking (RTS, CTS). Therefore, it is not possible to use a printer that requires it. Many printers have this as an added feature, even though it may not be required.

Setting External Printer Parameters

BAUD RATE

Generally, set the baud rate at the highest number that BOTH the monitor and printer support. The POET IQ supports baud rates of 300, 1200, 2400, 4800, 9600, and 19200 (sometimes written 19.2K) baud. The baud rate must be set the same on both the POET IQ and the printer. For example, if the printer can go up to 9600 baud, set them both to 9600 baud.

PARITY

The POET IQ does not set parity bits. Set the external printer for no parity.

STOP BITS

The POET IQ transmits only 1 stop bit. Some older printers require 2 stop bits. These printers cannot be used with Criticare monitors. Most printers do not allow any alteration to this setting. If possible, set the printer to accept only 1 stop bit.

DATA BITS

The POET IQ sends 8 data bits. Set the printer to accept 8 data bits.

HANDSHAKE MODE

POET IQ monitors use the XON/XOFF mode. Set the printer to accept XON/XOFF (or DC1/DC3) data.

Setting POET IQ Printing Parameters

These parameters are selected in the Setup Screen. To access the Setup screen, press the SETUP key on the front panel.

BAUD RATE

Set the baud rate to the highest rate that the printer and monitor can handle. The POET IQ supports baud rates of 300, 1200, 2400, 4800, 9600 and 19200 (sometimes written as 19.2K) baud.

PORT TIME

This sets the interval at which the POET IQ sends data to the printer. Selectable intervals are: OFF (demand printing by pressing the EVENT/PRINT key only), TREND (see explanation following), and 1, 2, 5, 10, 20, and 30 seconds; 1, 2, 3, 4, 5, 6, 8, 10, 15, 20, and 30 minutes; 1, 2, 4, and 8 hours.

The TREND interval setting prints out a Trend screen to the printer when the trend screen is 75% full. This makes a paper trend record with unlimited capacity available. A graphics mode (GRAPH 1 PRINT or GRAPH 2 PRINT) must be selected in the PORT MODE parameter on the Setup screen in order for this feature to work.

NOTE

- If GRAPH1 or GRAPH2 PRINTER is selected as the PORT MODE and the serial interval is not OFF, then DELAYING the printing will reset the serial interval to OFF, and the EVENT/PRINT key will function as a demand print key.

Serial Printer Formats

The following are examples of formats applicable for printing on an external printer.

ASCII PRINT prints out the patient data values as text only.

Time	SpO2	Pulse	Resp	CO2 (MMHG)	O2 (%)	N2O (%)	AGT (%)
10	97%	67	16	3 / 34	21 / 16	0 / 0	0.1 / 0.0
20	97%	73	22	0 / 33	21 / 16	0 / 0	0.1 / 0.0
30	97%	71	21	1 / 34	21 / 16	0 / 0	0.1 / 0.0
40	97%	70	14	0 / 36	21 / 17	0 / 0	0.1 / 0.0
Time	SpO2	Pulse	Resp	CO2 (MMHG)	O2 (%)	N2O (%)	AGT (%)
50	97%	67	16	3 / 34	21 / 16	0 / 0	0.1 / 0.0
16:14:00	97%	73	22	0 / 33	21 / 16	0 / 0	0.1 / 0.0

Figure A-1. This is an example of an ASCII PRINT printout from a 602-3A.

Graph 1 Print

GRAPH 1 PRINT prints contents of the current screen (Wave, Trend, Numeric, Set Limits, or Setup).

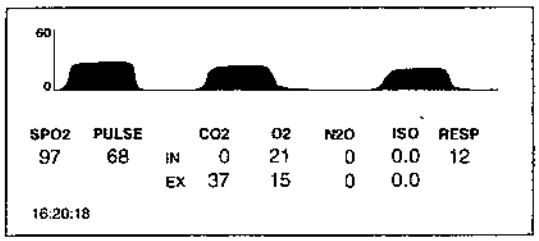


Figure A-2. This is a larger printout of the current screen (example).

Graph 2 Print

GRAPH 2 PRINT is a larger version of GRAPH 1 PRINT.

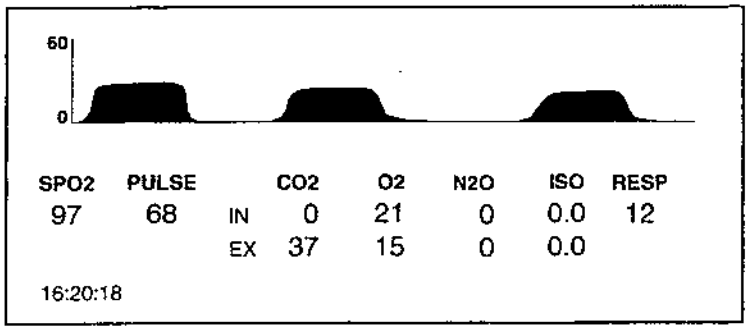


Figure A-3. This is a larger printout of the current screen (example).

ASCII TREND is used when transmitting trend data to computers. The OFF and ASCII TREND selections allow for event markers to be placed on Trend screens by using the EVENT/PRINT key. All PRINT modes use EVENT/PRINT as a demand print key (in addition to placing an event marker on trends).

Printing ASCII Data

When an external printer is connected to the monitor, ASCII data can be printed. To test the interface, select ASCII PRINT for the PORT MODE parameter in the Setup screen. Set the PORT TIME in the Setup screen to 10 seconds. Upon return to a Wave or Trend screen, the printer will print at 10-second intervals.

Interfacing with a Computer (cont.)

If an error condition exists, the line of ASCII output will be followed by the error message. The possible error messages are: SENSOR OFF, SENSOR SGNL, SEARCH (SpO_2 or Pulse in search mode), HIGH AMBIENT, WARMING UP, APNEA, OCCLUDED LINE, and REPLACE TRAP.

Printing Graphics

The POET IQ can print the current screen display using an external graphics printer. To do this, an Epson-compatible printer, such as a Diconix, HP ThinkJet, or Epson printer must be used. Select a graphics printing mode on the POET IQ under PORT MODE on the Setup screen (GRAPH 1 PRINT or GRAPH 2 PRINT). The screen will be printed. Remember that the PORT TIME parameter will determine how often the printer will print.

The EVENT/PRINT key acts as a "print on demand" key (in addition to placing an event marker) if the PORT MODE is set to Graph 1 or 2 printer. This means that the printer will print the current screen contents whenever EVENT/PRINT is pressed.

Interfacing with a Computer

To connect the POET IQ to a computer, match the parameters between the computer and the monitor as previously described. Note that the cable is different from a printer cable.

The ASCII modes are applicable for interfacing with a computer. ASCII TREND outputs the entire trend memory to the computer in the ASCII format. ASCII Print outputs current data on demand or periodically, at the time interval selected (Port Time).

ASCII Trend

The ASCII format consists of one line for each trended point. A carriage return (<CR> or <ASCII 13>) and line feed (<LF> or <ASCII 10>) sequence terminates each line. Data fields are separated by commas. If a value is not obtained due to an error condition such as SENSOR OFF or another error condition, the value is replaced by asterisks.

If the selected trend resolution is such that an average rather than a minimum and maximum value is stored, the minimum and maximum fields will be the same. (See Trends under **Section 3 -- Operation** for trend settings.)

A <control Z> (<ASCII 26>) marks the end of the file.

Interfacing with a Computer (cont.)

The last field is an event/alarm field which uses single characters to mark the following events:

*	Event marker placed by operator
S	Saturation alarm limit violated
P	Pulse rate alarm limit violated
E or C	$ETCO_2$ alarm limit violated
O	Oxygen alarm limit violated
A	Agent alarm limit violated
R	Respiration alarm limit violated

ASCII DATA FIELD FORMAT
The data is sent in the following sequence:

MM/DD/YY, HH:MM:SS, SAT MIN, SAT MAX, BPM MIN, BPM MAX, CO2 MIN, CO2 MAX, O2 MIN, O2 MAX, AGT MIN, AGT MAX, RSP MIN, RSP MAX , EVENT/ALARM (*,S,P,E,O,A,R)

EXAMPLES:

3/29/92 2:03:30, 89, 97, 65, 78, 20, 23, 47, 50, 1.0, 1.3, 8, 8 *S <CR> <LF>
3/29/92 2:03:30, **, **, ***, ***, **, **, **, **, ***, ***, **, **, <CR> <LF>
(KPAS or % mode for CO2)
3/31/92 11:33:00, 98, 98, 124, 124, 1.5, 3.1, 0, 0, 1.7, 2.0, 9, 10, P<CR> <LF>

To transmit the trend data, access the Setup screen and then press the EVENT/PRINT key (below the XMIT TREND label) while the Setup screen is displayed. To cancel the transmission, press EVENT/PRINT (below the DELAY XMIT label) again.

Interfacing with a Strip Chart Recorder (Analog Outputs)

The POET IQ has two analog outputs for use with strip-chart recorders, oscilloscopes, etc. The connectors are the BNC type, and are labeled CH. A and CH. B. The output range is 0-1 VDC. The Setup screen allows the selection of the following modes for the analog channels A and B parameters:

MODE	OUTPUT
TEST MODE	See the example in this section
$ETCO_2$	Holds most recent screen value
CAPNOGRAPH	CO_2 wave
PULSE RATE	Holds most recent screen value
O_2 SAT	Holds most recent screen value
PULSE WAVE	Plethysmograph
NURSE CALL	0 VDC (no alarms currently violated), 1 VDC (any alarm currently violated)
SAT 50 - 100	Holds most recent screen value
O_2 WAVE	Oxygen waveform
AGENT WAVE	Agent waveform
NITROUS	Holds most recent screen value
AGENT	Holds most recent screen value

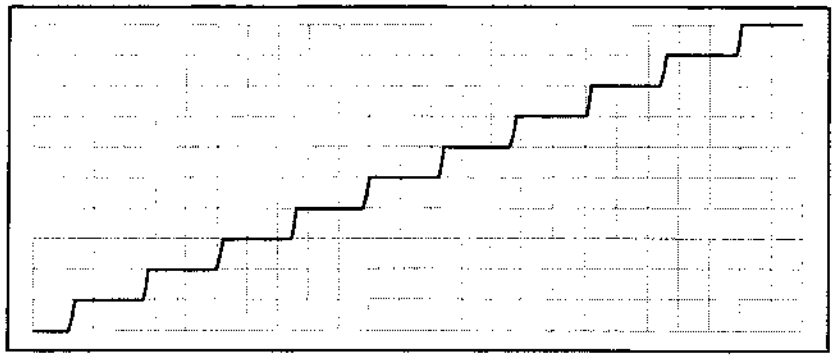
Interfacing to a Strip Chart Recorder (Analog Outputs) (cont.)

NOTE

- Maximum current available from each analog output is 20 ma. (source) or 8 ma. (sink).

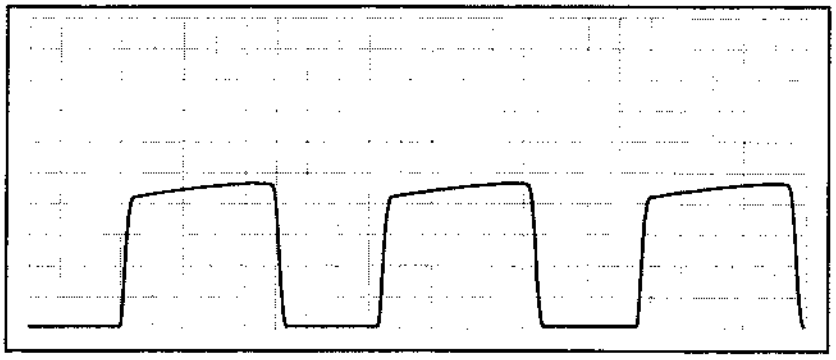
The following graphs are examples of waveforms from the analog outputs:

Test Mode



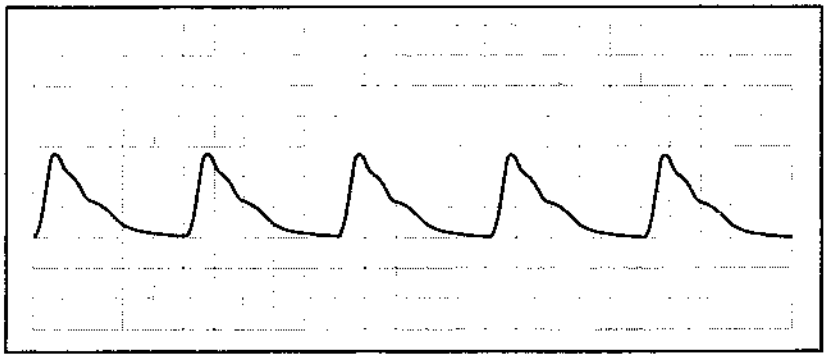
To confirm calibration, attach a voltmeter, oscilloscope or strip-chart recorder to the BNC connector output. The output will rise to 1.0 VDC at the end of the test cycle. The voltage increases in steps of 0.1 volt, rising to 1.0 volt, as shown.

Capnograph

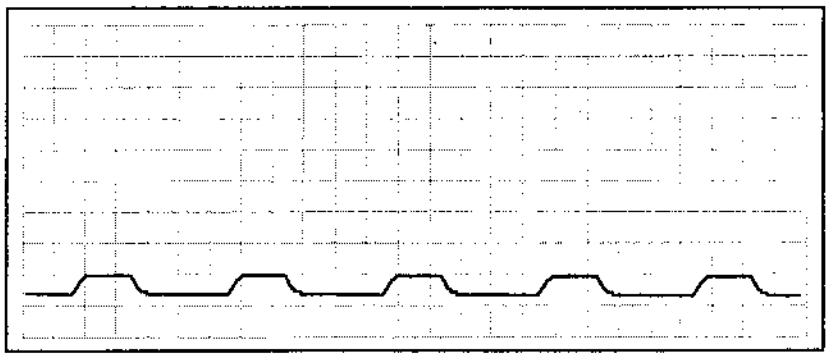


Interfacing to a Strip Chart Recorder (Analog Outputs) (cont.)

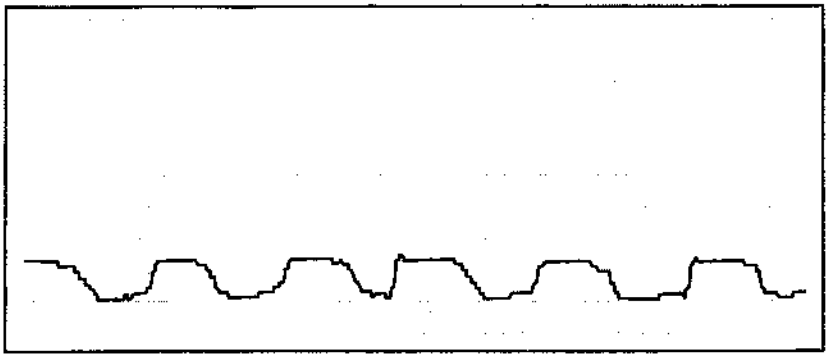
Pulse Wave



Oxygen Wave



Agent Wave



Interfacing to a Strip Chart Recorder (Analog Outputs) (cont.)

O_2 Sat

The O_2 SAT output in VDC corresponds to the two following charts:

O_2 SAT 0-100%	VDC
100	1.00
99	0.99
98	0.98
97	0.97
96	0.96
•	•
•	•
0	0.00

O2 SAT 50-100%	VDC
100	1.00
99	0.98
98	0.96
97	0.94
96	0.92
•	•
51	0.02
0-50	0.00

Pulse Rate

The PULSE RATE output in VDC corresponds to the following chart:

BPM	VDC
250	1.00
245	0.98
240	0.96
235	0.94
230	0.92
•	•
•	•
0	0.00

$ETCO_2$

The $ETCO_2$ output in VDC corresponds to the following chart:

% CO_2	KPa CO_2	mmHg	VDC
12.500	12.500	100	1.00
12.245	12.245	98	0.98
11.990	11.990	96	0.96
11.735	11.735	94	0.94
11.480	11.480	92	0.92
•	•	•	•
0.255	0.255	2	0.02
0	0.00	0	0

Nitrous Oxide

The N_2O output in VDC corresponds to the following chart:

N_2O 0-100%	VDC
100	1.00
99	0.99
98	0.98
97	0.97
96	0.96
•	•
•	•
0	0.00

Agent

The AGENT output in VDC corresponds to the following chart:

Agent	VDC
20.0	1.00
19.8	0.99
19.6	0.98
•	•
•	•
0.4	0.02
0.2	0.01
0	0.00

NOTE

- O_2 SAT, PULSE RATE, $ETCO_2$, N_2O, and Agent allow for trending on strip-chart recorders.

Interfacing with SpaceLabs, Inc. Universal Flexport™

The monitor is capable of interfacing with the SpaceLabs Universal Flexport, which is a device that allows monitors from other manufacturers to interface with monitors made by SpaceLabs.

The Universal Flexport interface on the monitor is not compatible with the original Flexport manufactured by SpaceLabs, Inc.

The monitor will output the following data through the RS-232 port to the Universal Flexport, when it is properly configured (see Configuring the Monitor in this section):

Waveform:	CO_2 (capnograph), sampled at 120 Hz
POET® IQ Numerics:	SpO_2, pulse rate, $ETCO_2$, inspired O_2, inspired N_2O, inspired agent, expired agent, respiratory rate

SpaceLabs Monitor Display

INFORMATION SHOWN

The SpaceLabs monitor will display the parameters shown above, and will update all numeric information every second. (The CO_2 waveform is updated ten times every second.)

With the exception of Expired Agent and Pulse Rate, all numeric information received from the Criticare monitor is stored as trend data in the SpaceLabs monitor (pulse rate is trended from a SpaceLabs ECG module or stand alone pulse oximeter).

DISPLAY FORMAT

Two display formats are available on the SpaceLabs monitor:

1) Large text display, where the CO_2 waveform is superimposed over some of the numeric values

2) Small text display, where the CO_2 waveform is shown to the left and following values will be shown to the right:

602-3A, 602-3B, 602-4A, &602-4B	602-6A & 602-6B
SpO_2	$ETCO_2$
Pulse	Respiratory Rate
$ETCO_2$	Inspired O_2
Inspired O_2	Expired Agent

NOTE

- On the SpaceLabs monitor the inspired values have an "I" prefix and expired values have an "E" prefix.

Waveform Gain

CO_2 waveform gain can be selected on the SpaceLabs monitor. Choices are 0 - 60 mmHg (0-7.5vol% or 0-7.5 kPa) and 0-100 mmHg (0-12.5vol% or 0-12.5 kPa). The default scale is 0-60 mmHg.

Sweep Speed

CO_2 waveform sweep speed can be selected on the SpaceLabs monitor (50, 25, 12.5, 6.25, 3.13, or 1.56 mm/sec.).

Units

Pulse Rate units are beats per minute (designated as bpm). Respiration Rate units are breaths per minute (designated as BPM).

CO_2 units for the Criticare monitor and the Flexport monitor are set on the Criticare Setup screen. If CO_2 units are changed while the Criticare monitor is connected to the Universal Flexport, CO_2 trend values on the SpaceLabs monitor may be incorrect from that point on (the operator can clear trends on the SpaceLabs monitor after the units are changed).

NOTE

- CO_2 waveforms on a SpaceLabs monitor recorder will always be printed in mmHg, regardless of the current CO_2 unit selection.

Alarms and Messages

LIMITS

Alarm limits are set on the POET IQ monitor only. Alarm limit information is sent to the SpaceLabs monitor upon power up, when any limit is changed, when any mode is brought out of standby when entering or exiting Smart Alarm mode, or when CO_2 limits are changed.

OTHER MESSAGES

Other messages displayed on the Flexport monitor are identical to those displayed on the Criticare monitor.

Only one message is displayed at a time. In the case of simultaneous messages, the messages scroll at five second intervals each.

A secondary alarm, which produces a tone every ten seconds on the SpaceLabs monitor, is generated for a "loss of signal" or "no data" condition.

Universal Flexport permits a maximum of six parameters with alarms. Pulse Rate and N_2O have been defined as non-alarming parameters from the Criticare monitor. The Criticare monitor is capable of generating alarms for all parameters.

AGENTS

An anesthetic agent mix condition will result in blanked (--) inspired and expired agent fields on the SpaceLabs monitor, with the message "mixed agent".

Agent Identification

The anesthetic agent identifier on the POET IQ (for example, ISO, HAL, ENF) is not shown on the SpaceLabs monitor. The label will always show as "AGT," since the Flexport does not permit parameter labels to be changed unless the entire channel is turned off.

Disabling and Silencing Alarms

The audio portion of each individual alarm can be disabled on the SpaceLabs monitor, regardless of the settings on the Criticare monitor (disabling the audio for an alarm on the SpaceLabs monitor will not do the same for the alarms on the Criticare monitor).

All alarms on the SpaceLabs monitor can be simultaneously suspended (equivalent to "ALARM SILENCE" on the POET IQ) for either 45 seconds, 3 minutes, or they may be disabled indefinitely.

Recordings

Recordings generated by alarm violations on the SpaceLabs monitor display the alarming parameter plus three other pre-defined parameters as follows:

POET® IQ ALARM PARAMETERS

Alarming	Associated Parameters	
Parameter	602-6A & 602-6B	602-3A, 602-3B, 602-4A, & 602-4B
SpO_2	n/a	Pulse, $ETCO_2$, Resp
$ETCO_2$	Resp, E Agt, I O_2	Resp, E Agt, SpO_2
RESP	$ETCO_2$, E Agt. I O_2	$ETCO_2$, E Agt, SpO_2
I O_2	I Agt, Resp, $ETCO_2$	I Agt, Resp, Pulse
I AGT	$ETCO_2$, E Agt, I O_2	$ETCO_2$, E Agt, I O_2
E AGT	Resp, $ETCO_2$, I O_2	Resp, $ETCO_2$, I Agt

NOTE

- CO_2 waveforms on a SpaceLabs monitor recorder will always be printed in mmHg, regardless of the current CO_2 unit selection.

Configuring the POET IQ for Universal Flexport

To configure the Criticare monitor for use with the Universal Flexport, the following Setup screen settings are required:

PORT MODE:	"UNIV FLEXPORT"
PORT TIME:	"1 SEC"
BAUD RATE:	"9600"

(Refer to the POET IQ Operator's Manual, under **Section 3 -- Operation** if setup instructions are required.)

The interface between the Criticare monitor and Universal Flexport requires a serial RS-232 cable (DB-25 male connector on one end, and RJ-11 modular phone plug on the other). The cable is available from SpaceLabs.

For additional information on the Universal Flexport, consult your Flexport user's manual.

Appendix B — Accessories

Gas Monitoring

Description	Cat. No.
Disposable Water Chek™ water trap (box of 25)	618
Disposable Water Chek™ with drain line (box of 5 Water Cheks and 15 sample lines)	626
Chek-Mate™ moisture filter (high humidity adapter), box of 25	918
Replacement sample line (PVC), box of 25	625
Replacement sample line (PE) for reduced agent absorption, box of 25	625A
Endotracheal adapter, straight (box of 10)	616
Endotracheal adapter, elbow (box of 10)	617
Sampling catheter w/elbow (box of 10)	619
Divided nasal cannula for gas sampling and delivery (box of 10)	628
Scavenging kit (scavenger adapter and exhaust line)	655
Anesthetic agent calibration kit includes:	630
-Cal gas aerosol, 1% Isoflurane, 5% CO_2, 60% N_2O, Bal N_2	631
-Cal gas aerosol, 1% Enflurane, 5% CO_2, 60% N_2O, Bal N_2	634
-Cal gas aerosol, 1% Halothane, 5% CO_2, 60% N_2O, Bal N_2	635
(Each cylinder contains 1 nozzle fitting with Tee tubing)	
Cal gas aerosol, 2% Sevoflurane, 5% CO_2, Bal N_2	636
Cal gas, aerosol, 7% Desflurane, 5% CO_2, 60% N_2O, Bal N_2	656
Replacement O_2 cell	644
Replacement CO_2 absorber	643

NOTE

- Indented items are items contained in a kit and can be ordered separately.

Pulse Oximetry

Description	Cat. No.
Finger sensor (10 foot cable w/ Lemo connector)	511
SHELL finger sensor (10 foot cable w/Lemo connector)	934
Short cord finger sensor (2-foot cable -- for use with patient cable Cat. No. 518)	511S
Multi-Site™ sensor package -- includes:	516
-Multi-Site™ sensor	517
-Patient cable	518
-Forehead applicator and headband	513
-Ear clip adapter	514
-Double-sided adhesive dots	525
-Microfoam tape - 2 pkgs. (4' strips, 14 per pkg.)	526
One-piece Multi-Site™ reusable sensor package -- includes:	51610L
-One-piece Multi-Site™ reusable sensor (with 12-foot cable and lemo connector)	51710L
-Patient cable	518
-Forehead applicator and headband	513
-Ear clip adapter	514
-Double-sided adhesive dots	525
-Microfoam tape - 2 pkgs. (4' strips, 14 per pkg.)	526
Neonatal disposable sensor (25 mm)	573
Infant disposable sensor (20 mm)	572
Pediatric disposable sensor (20 mm)	571
Adult disposable sensor (25 mm)	570
Disposable sensor variety pack--includes 10 adult, 5 pediatric, 5 infant, and 5 neonatal disposable sensors	574
Patient cable (connects to short cord finger sensor, Multi-Site™ sensor, and disposable sensors)	518

NOTE

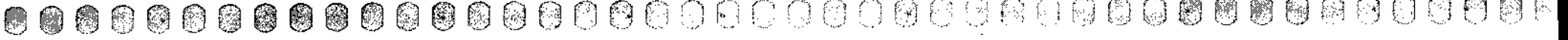
- For neonatal specific Multi-Site™ sensor, or additional sensor options, contact your local Criticare sales representative.

ECG

Description	Cat. No.
ECG electrodes (3)	527/3
ECG lead wires (shielded) (3)	556/3
ECG cable, shielded (North America)	629
ECG cable, shielded (International), includes 3 lead wires	629A

Miscellaneous

Diconix 180si printer kit, contains:	660
-Diconix 180si printer	- - -
-Diconix AC charger/adapter (110V) (Order Criticare part no. 80115B001)	- - -
-Printer paper for Diconix (Uses standard computer printer paper)	- - -
-Diconix Ink Jet Cartridge (Order Criticare part no. 41112B001)	- - -
-Serial interface cable (male-to-male null modem DB-25 cable)	661
Power cord (North America)	909
Power cord (International)	910
Glare reduction screen (order Criticare part no. 41540B001)	- - -
5-Agent POET® IQ Operator's manual	1186
POET® IQ Service manual	1187



Addendum to the POET IQ Software

Master Software Changes v.1.2

Master software on the POET IQ, model 602-xA series has been upgraded to include the following changes:

1. Alarm limits: The Alarm Limits screen now displays the limits of parameters in the standby mode.
2. Alarm pitch: On the Setup screen the user will now have the ability to change the audio pitch of the physiologic alarms.
3. SpaceLabs Universal Flexport interface: The alarms have been re-enabled on the Universal Flexport when used in conjunction with the POET IQ interface.

Alarm Limits in Standby Mode

For all standby modes, SBY appears in place of numeric values for each function in standby. All monitoring and alarms are suspended for those parameters. When not in standby, the "--" symbol indicates that a function is ready to operate. Displayed waveforms (or trends) corresponding to parameters in standby will remain displayed until the waveform (or trend) choice is changed. Those waveforms (or trends) will not be accessible again until that parameter is returned from standby.

Alarm limits of parameters in the standby mode are now displayed on the Alarm Limits screen.

Audio Pitch

The audio pitch for Physiologic Alarms can be adjusted in the Setup screen.

Settings: 1 (low), 2, **3**, 4, 5, 6 (high). Value of 3 is equal to the previous fixed pitch. (power-up default = previous setting)

Selects audio pitch for physiologic alarms and tone produced when any key is pressed.

Software Update Addendum

POET IQ Master Software v.1.2 Update Installation Instructions

Update

This document describes the procedure to update a POET IQ with master software.

Kit contents

The master software kit (Criticare Cat. No. 1190) contains the following items:

- 1 EPROM chip, v.1.2
- 1 Update Addendum
- 1 Installation Instructions (this sheet)

Tools Required

Installation of the master software kit requires the following tools:

- Standard hand tools
- 28 pin EPROM pull
- Grounding station (anti-static mat and wrist strap with one megohm resistor)
- Razor blade or knife

⚠ CAUTION ⚠

- STATIC SENSITIVE DEVICE! To prevent damage to the POET IQ, observe the following precautions:
  - — Perform the procedure on an antistatic mat.
  - — Wear a wrist ground strap.
  - — Connect the wrist strap and mat through a resistor (1 megohm or greater) to a good earth ground.

NOTE

- Before beginning, press SETUP, and write down the settings for the various parameters (this may erase previous settings).

Tools Required (cont.)

1. Make sure that the power to the monitor is off, and disconnect the POET IQ power cord from the AC receptacle.

⚠ WARNING ⚠

- Touching hazardous voltages inside the POET IQ housing with the AC power connected can cause electrical shock resulting in death or severe personal injury.

2. Remove the four screws which secure the top cover to the POET IQ. Remove the cover by lifting it straight up (cut the quality seal with a knife or razor blade, if necessary, and write your initials on the seal).
3. Place the POET IQ on its left side.
4. Remove the three screw securing the underside of the front panel to the lower housing panel.
5. Place the POET IQ right side up.

NOTE

- Before performing the next step, lay a soft, clean cloth on the work surface immediately in front of the POET IQ to prevent scratching of the panels.

6. Holding the front panel, remove the remaining two screws that secure the right and left sides of the lower housing panel to the front panel.
7. Allow the front panel to tilt downward and rest face down on the cloth.

⚠ CAUTION ⚠

- When removing or replacing the EPROM, be careful not to short surrounding metal components together, as this may damage the monitor.

8. Locate the EPROM U31 on the CPU board (refer to CSI board drawing Part No. 90290A003). This is the master EPROM. Note the EPROM's orientation in its socket, then carefully remove the EPROM from the socket.

Tools Required (cont.)

⚠ CAUTION ⚠

- Do not insert EPROM's backward in their sockets. Doing so will destroy the EPROM! Use the notch on the edge of the EPROM to note its orientation.

9. Orient the Master EPROM supplied in the same way as the old one (with the notched end towards the bottom of the bezel), then carefully insert the new EPROM into the socket for U31. Be careful not to bend the leads.
10. Reassemble the POET IQ by reversing the order and procedure in steps 1 through 7. Use the painted screws to secure the sides of the front panel. Use the remaining (plated) screws to secure the bottom of the front panel.
11. Perform safety tests.
12. Set the parameters in the Setup screen as noted before beginning this update procedure, and set the clock.

POET IQ Specifications Addendum

Description

The desflurane accuracy specifications have been changed for the POET IQ. On page 1-20 of the POET IQ Operator's Manual, the desflurane specification (under the "Anesthetic Agents" heading) should be updated to read as follows:

Accuracy (single agent)		
	enf, sev	0-3%, ± 0.2 vol %
		3-7%, ± 0.3 vol %
	hal, iso	0-3%, ± 0.2 vol %
		3-5%, ± 0.3 vol %
	des	0-3%, ± 0.2 vol %
		3-7%, ± 0.3 vol %
		7-15%, ± 0.5 vol %
		15-20%, unspecified