Two ADS brands at BWH

GE = GE-Datex-Ohmeda
   Modulus 2+, Aestiva, Aisys

Draeger = Draeger-Siemens
   Narkomed MR, Fabius GS, Tyro GS
Three Ventilator types at BWH

Old fashioned Bellows movement control
Fresh Gas Flow decoupling
Exhaled tidal volume feedback
Compensation for Compliance
Four Gas Flow Sensor Technologies at BWH

Turbine Flow Sensor
Hot wire Anemometer Flow Sensor
Differential pressure across an orifice Flow Sensor
Ultrasonic Flow Sensor - MR-compatible
Sampled Gas Monitors at BWH

All Gas Sensor connections need to be tight
Loose Gas Sample Line will give incorrect gas readings
Monitor will read mixture of patient gas and room air
Dilution applies to Inspired and Expired readings
Oxygen dilutes toward 21%, CO2, Agent, N20 dilute toward 0.
Clinician ETpCO2 = approximately 40 mmHg. This is a good test.
Tubing should be connected before monitor is turned on
Monitor measures flow resistance and alarms on problems
Two Gas Sensor Technologies at BWH

Circuit Oxygen
Sampled Gas analysis for multiple gases
CHARCOAL ANESTHETIC AGENT ABSORBERS

Charcoal Absorbers can remove volatile agents from effluent gas. Outlying Anesthetizing Locations need innovative scavenging. Charcoal Absorbers absorb 50 g anesthetic. Charcoal Absorbers absorb almost the same amount that vaporizer delivered.
ALTITUDE EFFECTS ON VAPORIZERS

Concentration Delivery Vaporizers and Flowmeters
Partial Pressure Delivery Vaporizers
Approximate Partial Pressure Delivery Vaporizers
Draeger Fabius requires you press Rotary Knob to confirm vent settings

GE Interface (Smart-Vent and Aisys) Confirms with Knob or selected Button

Beware, Beware, Beware

This is a challenge to all of us
OXYGEN RATIO CONTROL DIFFERENCES AMONG MACHINES

Ohmeda Anes Machines (Ohmeda Modulus 2 and SE)
Hidden Chain links O2 and N2O needle valves

Draeger Anes Machines (Fabius, Tiro, Narkomed, Future)
Flow changes by itself when other flow is adjusted

Real question on Anesthesia Boards 2006
Negative Pressure Leak Test (NPLT)
Draeger Fabius Alarms can be confusing
Pre-Use Check Documents are available

Every machine has its machine-specific pre-use check list attached.

Pre-Use Check is usually on chain at right back corner of Anes Machine.

Pre-Use Checks vary slightly from model to model.

Draeger Fabius is very different and included automatic ventilator calibration.

Documents (Microsoft Word) are available several places.
Abbreviated Pre-Use Check misses a bit

Manual Resuscitator (e.g., Ambu Bag) should be present
One on Anes Machine, One on Red Cart
Fabius - Flow Sensor Calibration is electronic. Do it.
Sample Gas Return and Sample Gas Sensor - On/On or Off/Off
If Sample Gas Return is not On, connect sample gas to Scavenger
CO2 Absorbent mostly white
Just say “no” to 100% O2 Cal

21% is necessary and sufficient
Fabius has a Water Trap

Between Ventilator and Breathing Circuit
Water condenses here

Keep it empty
Aisys needs to be switched off every 24 hours
PEEP Valves on older machines

Removable

5 cm H2O and 10 cm H2O

Assemble simply
All this Equipment Info is available on line:

Anesthesia Department Web Site
http://etherweb.bwh.harvard.edu
And navigate to
Education / Educational Resources / Technology Matters

Or go directly to
http://etherweb.bwh.harvard.edu/education/resources/anes_tech.php
Special thanks to Anes IS Team
Jamie Bell, Dan Holtzman,
Fred Donovan, Anthony Kirwan, Bob Gimlich
Thank you
The Semi-Closed Circle-Absorber System

Sampled

Expired

CO₂ Absorbant

200 mL/min

Fresh

Inspired

Rebreathed

Exhaust

Sampled
200 mL/min