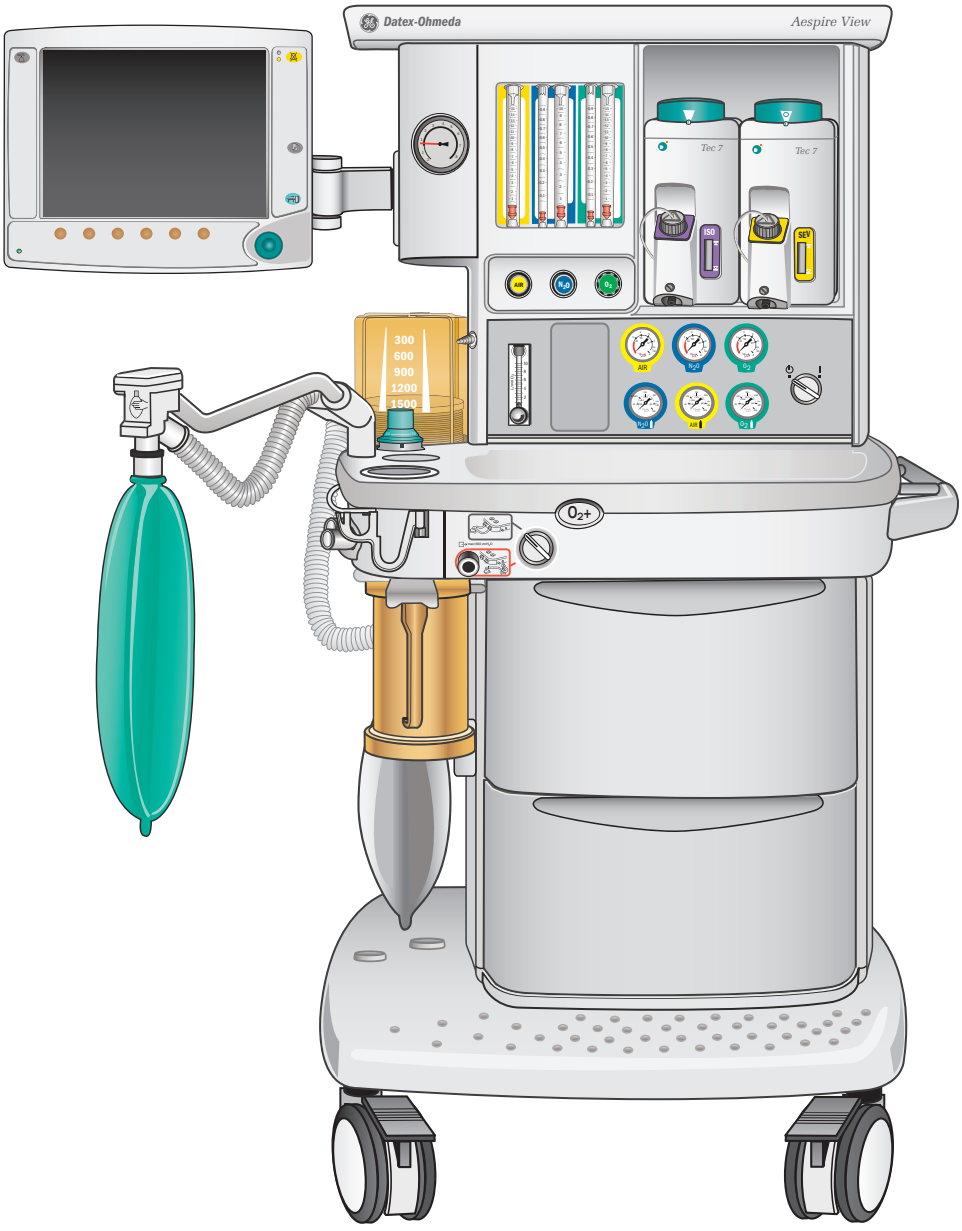
GE Healthcare

Aespire View 6.X

Participant Guide

Version A



Education Services
Clinical Development

Aespire View 6.x

Participant Guide

Version A

Education Services

Clinical Development

Customer Support Center: 800-345-2700

Notice

The materials contained in this document are intended for educational purposes only. This document does not establish specifications, operating procedures or maintenance methods for any of the products referenced. Always refer to the official written materials (labeling) provided with the product for specifications, operating procedures and maintenance requirements.

Note! *This participant guide is not intended to replace the User's Reference Manuals that you received with the machine. Please refer to the disclaimer notice at the end of this participant guide for more information.*

This course is intended for Aespire software level 6.X. The material contained in this course is intended for educational purposes only. Always refer to the official written materials provided with the Aespire anesthesia system for specifications, operating procedures, and maintenance requirements.

Contents

1 Welcome

We would like to take a moment to thank you for choosing GE Healthcare for your anesthesia carestation needs. Our goal now is to provide you with the best training service available while continuing to support you as you use our products in your workplace.

Class Description

This course is designed to give Participants the information and product knowledge needed to proficiently operate the Aespire View. This class will use discussion, scenarios and return demonstrations. The application of problem-solving techniques will also be incorporated.

Participant Learning Objectives

At the end of this in-service the participant will be able to:

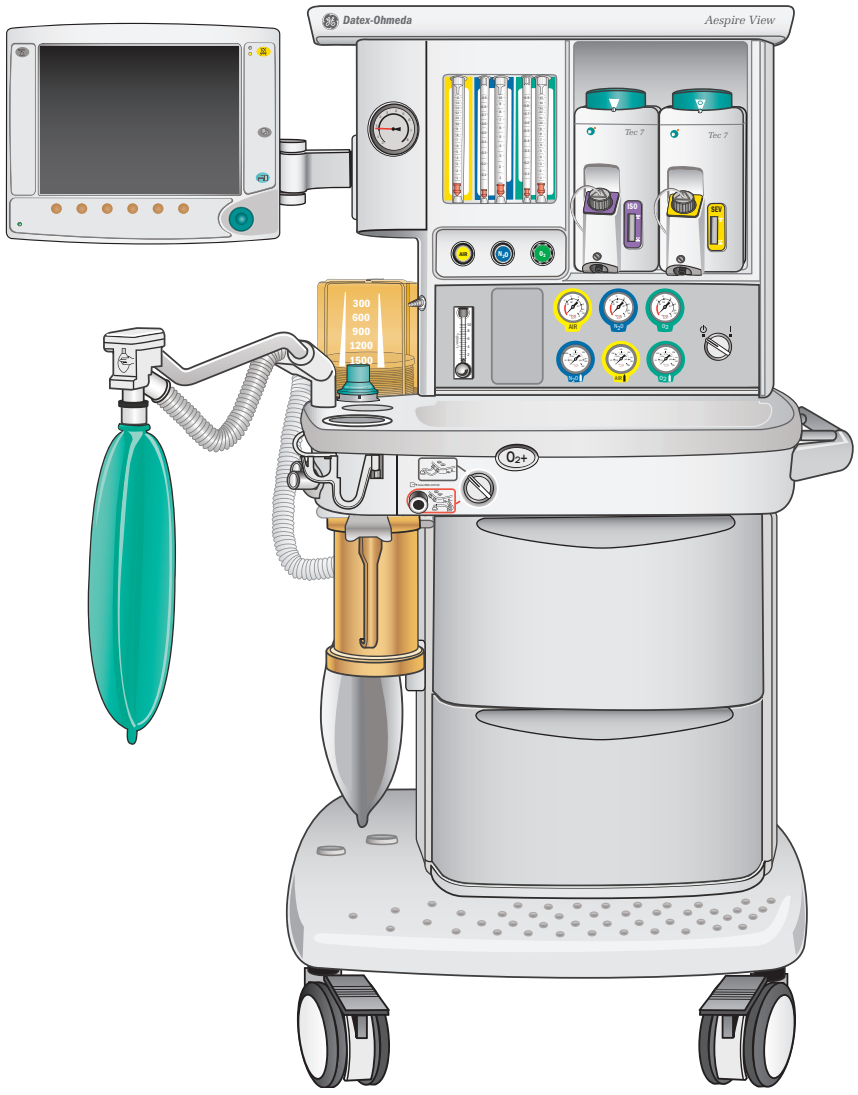
- Describe the main components of the Aespire View
- Power up the Aespire View and recognize when battery power is active
- Use the Alarm Silence key to silence existing alarms and to pre-silence an alarm
- Use the Volume Alarms key to turn the volume alarms on and off
- Change a ventilator setting using a Quick Key
- Calibrate the O_2 sensor
- Remove, replace, and fill a Tec series vaporizer
- Check the Aespire View for proper scavenging
- Perform a complete system checkout
- Access all ventilation modes available and change a setting for each mode
- Adjust individual alarm limits
- Activate the Cardiac Bypass mode
- Use the End Case key to minimize alarms between cases

2 The Aespire View

Overview

All anesthesia systems are comprised of five key components, and the Aespire View is no exception. These are:

- Gas Regulation and Flow Control
- Vaporization
- Gas Management and Scavenging
- Ventilation
- Monitoring



Aespire View Front Components

The Aespire View consists of many individual parts to provide a complete anesthesia delivery unit. The individual parts are as follows:

A System Switch
Located on the right hand side of the machine, the system switch turns on or off both the gas flow and the electronics.

B Pressure Gauges
These gauges indicate the pressures of the gases coming into the machine. The upper row of gauges indicates the pressures for the primary gas supplies (usually pipeline). The lower group of gauges indicates the pressures for the secondary gas supplies, which are provided by cylinders.

C Brakes
On each front wheel of the Aespire you will find a brake to minimize movement of the machine. Each brake operates like a rocker switch to set or release the brake on that wheel. To engage each brake, step down on it towards the front of the machine. To disengage it, push the brake towards the back of the machine with your foot.

D Auxiliary Common Gas Switch
The switch that sends fresh gas either to the auxiliary common gas outlet or to the breathing system.

E Auxiliary Common Gas Outlet (ACGO)
An outlet on the outside of the machine that is primarily used for performing the low pressure leak test, a part of the FDA checkout.

F O_2 Flush Button
Regardless of the position of the system switch, the user can press the oxygen flush button, the oval button recessed into the front left corner of the tabletop. This will either deliver a high volume of oxygen to the patient, or inflate the bellows or the rebreathing bag.

G Auxiliary O_2 Flowmeter
The auxiliary O_2 flowmeter is an optional accessory. It is most often used to deliver oxygen through a nasal cannula. Oxygen is always available here; regardless if the machine is turned on or not.

H Flow Controls
Once the system switch is turned on, the flow controls can be adjusted to set the desired amount of fresh gas being sent to the patient. There is a flow control knob for each gas on the machine.

I Display
When the patient is being mechanically ventilated, the desired parameters are entered on the display. An example of these settings would be the size and rate of the breath to be delivered to the patient by the ventilator. Also found on the display are more buttons and menu selections concerning alarms and other machine functions.

J Flowmeters
The flowmeters indicate the rate of fresh gas being sent to the patient. They consist of marked glass tubes with floats inside them.

K Vaporizers
The vaporizers contain the anesthetic drug that is to be delivered to the patient. Only one vaporizer is used at a time. The amount of anesthetic to be administered is set by turning the dial on the top of the vaporizer to the desired percentage.

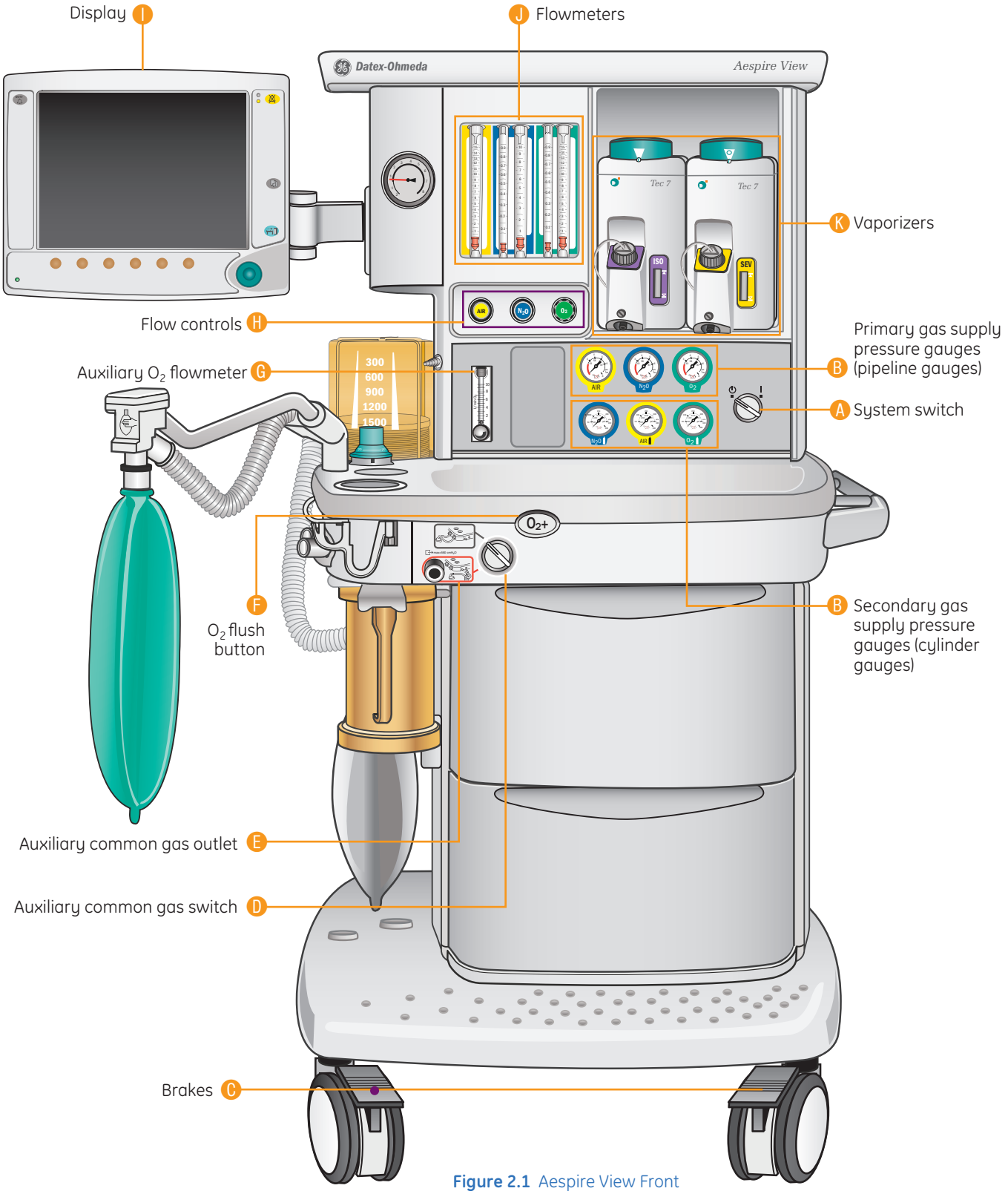


Figure 2.1 Aespire View Front

Aespire View Side Components

Moving around to the left side of the Aespire, figure 2.2 calls out the components starting with the bellows assembly and moving clockwise.

A Bellows Assembly
There are two ways to deliver gas to the patient. One way is mechanically, through the use of the ventilator. In this case, the gases that are to be delivered to the patient are contained within the bellows assembly.

B Absorber Canister
This component removes carbon dioxide from the patient's exhaled breath. These "scrubbed" gases can then be sent back to the patient.

C Rebreathing Bag
The second way to deliver gas to the patient is manually. The clinician squeezes the rebreathing bag, which contains a mixture of gases.

D Ezchange and Condenser Options: The Ezchange option will allow the user to change a canister during a case without introducing a large leak. The condenser option helps to remove moisture from the freshly scrubbed gas that comes out of the canister before going to the inspiratory flow sensors.

E Scavenging Connector
Every Aespire will have some sort of scavenging connector. The type of connector depends on the configuration of the operating room. Regardless of the connector style, a hose is hooked up to it in order to safely remove excess gas from the room.

F Breathing System
On the left-hand side of the Aespire is the breathing system. The breathing system includes everything between the bellows and the carbon dioxide absorber. The components within this portion of the machine are the ones that come into direct contact with the patient's breath.

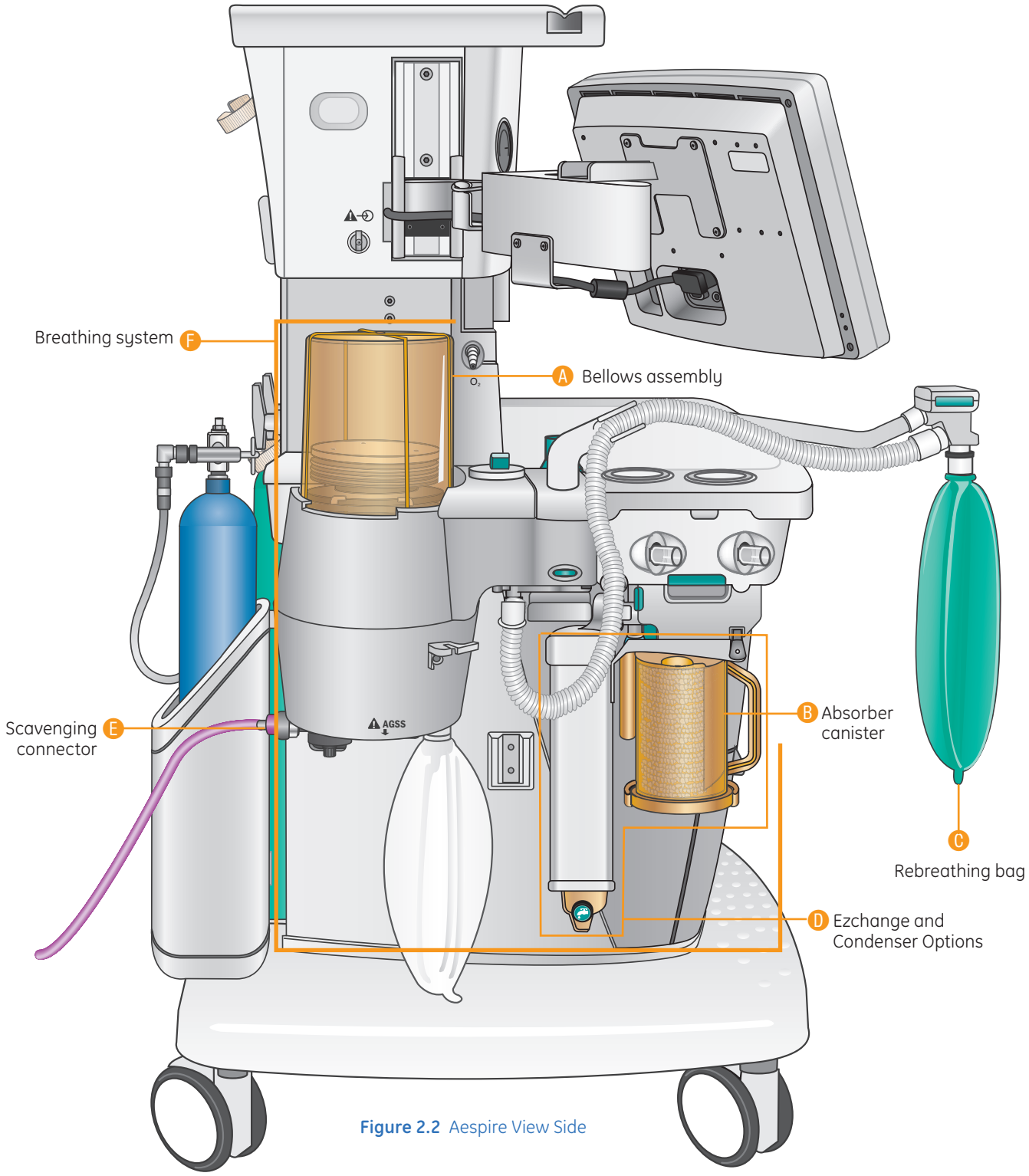


Figure 2.2 Aespire View Side

Aespire View Back Components

Rotating to the back of the machine, Figure 2.3 shows the components visible from the back of the Aespire. Let's start with the electrical outlets and move counterclockwise.

A Electrical Outlets
The electrical outlets on the back of the Aespire are a convenient place to plug in any accessories that are used in conjunction with the anesthesia machine. This is one of the ways to help reduce the amount of cord clutter behind the Aespire.

B Suction Regulator
The suction regulator is also an optional accessory. It provides a source of suction directly from the Aespire.

C Pipeline Inlets
Hoses are connected between the pipeline inlets and the gas outlets in the operating room. This is one way that gas gets into the anesthesia machine.

D Cylinder Yokes
Cylinders provide another source of gas for the anesthesia machine. The inboard cylinder yokes extend out of the back of the Aespire so two cylinders can be mounted to the machine.

E Main Circuit Breaker
On the bottom left side is a rocker switch. This is the main circuit breaker. It should not be mistaken for an on/off switch. Accidentally pressing this switch will cause the Aespire to be powered by its reserve battery instead of electricity from the wall outlet.

F Cylinders
Cylinders are used as a gas supply when the pipeline supply is unavailable. Any two cylinders of nitrous oxide, oxygen, or AIR can be attached here (provided at least one of them is an oxygen cylinder).

G Flexible Yoke
This is the cylinder yoke used for outboard mounting of an optional nitrous oxide cylinder. A flexible hose attaches the cylinder yoke to the Aespire. The cylinder sits in a bracket on the machine below the bellows assembly.

This is a very quick glance at the Aespire. Most of these components will be explored in much greater depth throughout the course of this book. This chapter is intended to be a brief overview, but can also serve as a reference for you on the names of the major components.

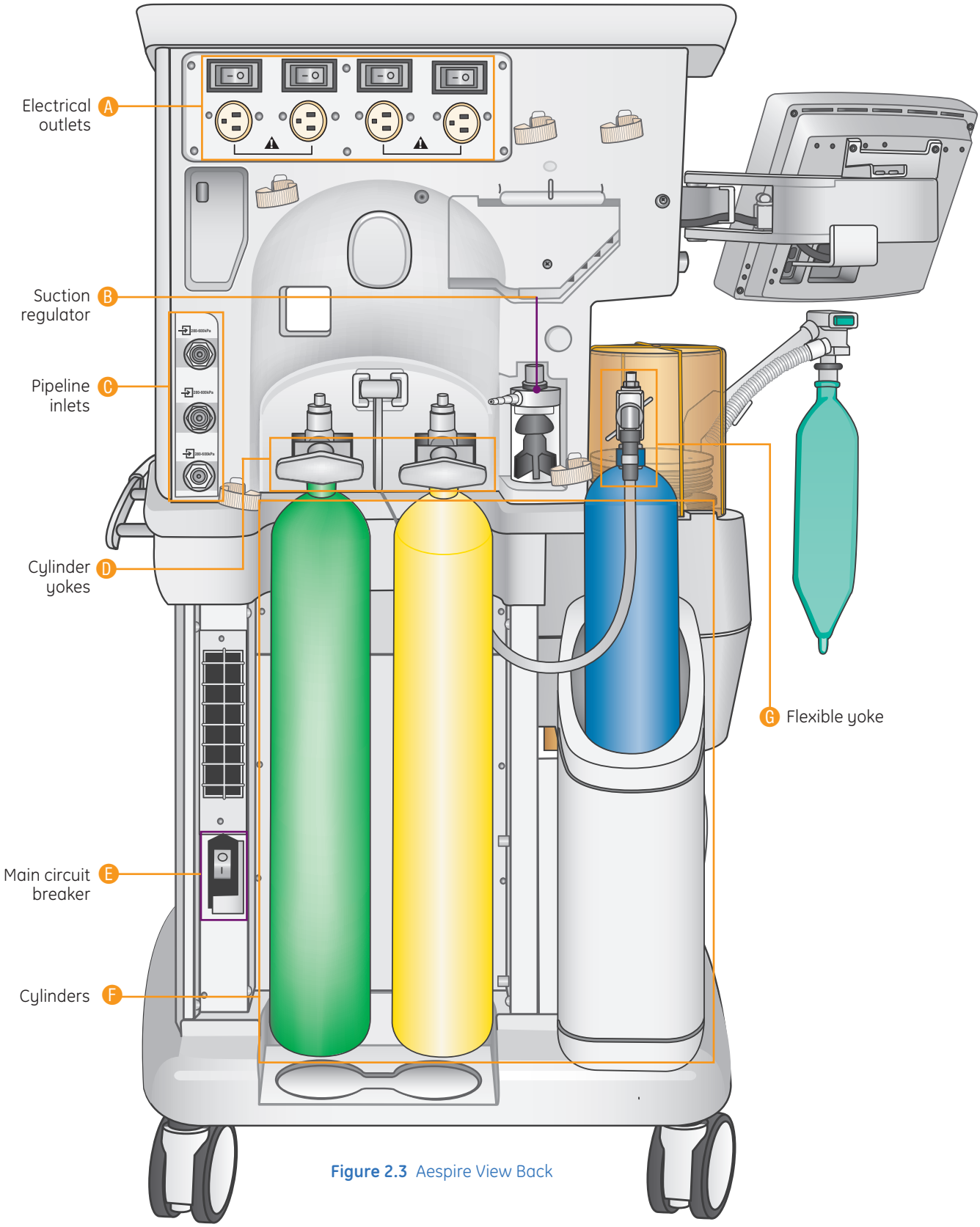


Figure 2.3 Aespire View Back

Anesthesia Display Overview

A **Volume Alarms**: This button turns the volume alarms either on or off. By "volume" we are talking about a quantity of gas, not audio volume. Specifically, these alarms are for the exhaled tidal volume (VTE) and for the exhaled minute volume (VE). When the volume alarms are active (On) an audible alarm will sound if the exhaled tidal volume and/or the exhaled minute volume do not fall within the range of the alarm limits. When the volume alarms are inactive (Off) there is a large "X" over the limits.

B **Waveform Area:** The pressure waveform is a real-time pressure indicator located in the middle of the display that depicts the waveform associated with the pressure inside the patient's lungs. Numeric pressure information is also displayed in the digit fields to the right of the waveform.

C **Alarm indicator LEDs:** In addition to the audible alarms, the system displays visual alarm indicators by lighting one or both of the Alarm indicators. The bottom LED is for low or medium priority alarms and the top is for high priority alarms. An example of a high priority alarm is APNEA.

D **Alarm Silence**: Pressing the alarm silence button will silence most alarms for 120 seconds. If the button is pressed when there are no alarms occurring, this will "pre-silence" most future alarms for 90 seconds. This means an alarm message would appear on the screen without an audible alarm.

E **Measured Values**: Measured patient values, derived from the sensors in the machine, are shown in this portion of the screen. These include minute volume (VE), rate and tidal volume (VTE) to name a few.

F **Menu**: Pressing the menu button gives the user access to setting the ventilation mode, alarm settings, special functions of the Aespire, O2 cell calibration, and screen and audio settings. Although the Menu is not needed to change the key ventilation parameters for the current ventilation mode, the menu must be used to change from one ventilation mode to another.

G **End Case**: After a patient is taken off the Aespire, it is convenient to let the machine know this. Otherwise the Aespire will generate volume and apnea alarms since it does not detect any gas coming back from the patient. Apnea alarms occur when the system does not detect the presence of a breath in the last 30 seconds. Pressing the end case button (and then confirming this selection) silences the volume and apnea alarms that would occur after the patient is taken off the machine.

H **Total Flow sensing (optional):** The total flow sensing (TFS) option electronically measures the fresh gas flow at the mechanical flow tubes. The total fresh gas flow measurement displays on the bottom right corner of the screen. The measurement specifies:

- Total gas flow.
- O_2 gas flow.
- Air gas flow.
- N_2O gas flow.

I **Command Wheel**: The command wheel (or com wheel for short) is used to change and confirm the settings on the display. For example, to change a ventilation setting, the user presses the button below the setting to be changed, and then turns the com wheel to adjust the value. This new value does not go into effect until it is confirmed. To confirm the setting, either the same

selection button is pressed again or the com wheel can be pressed (similar to pressing the Enter key on a computer).

J **Ventilation Settings**: These buttons allow the clinician quick access to the ventilation parameter settings, such as the tidal volume or the number of breaths per minute delivered to the patient (rate). To change a setting, the clinician presses the button below that value on the display screen and turns the com wheel left or right to decrease or increase the value. If there are limits for a particular setting, these are shown in a bar graph below the current setting. The user then presses the selection button or the com wheel to confirm the new value.

K **Vent On**: Before starting mechanical ventilation, the clinician will confirm that ventilation settings are appropriate for the patient. Then to start mechanical ventilation, the user simply moves the Bag/Vent Switch to the Vent position. If the Aespire is turned On with the switch in the Vent position, the switch will need to be moved to the bag mode and then back to the vent mode to start ventilating. There would also be a message on the screen to this effect. When the ventilator is turned on, the "Vent On" message appears on screen above the ventilation setting button on the far left.

L **AC Power**: Before anything can happen, it is good to know that we have AC power—that is, power is coming from the wall outlet and not from the backup battery. When this green light is illuminated, it means the Aespire is running off of AC power. If the AC power light is not On, and the machine is running, the Aespire is running on battery power. There would also be a message on the screen to this effect.

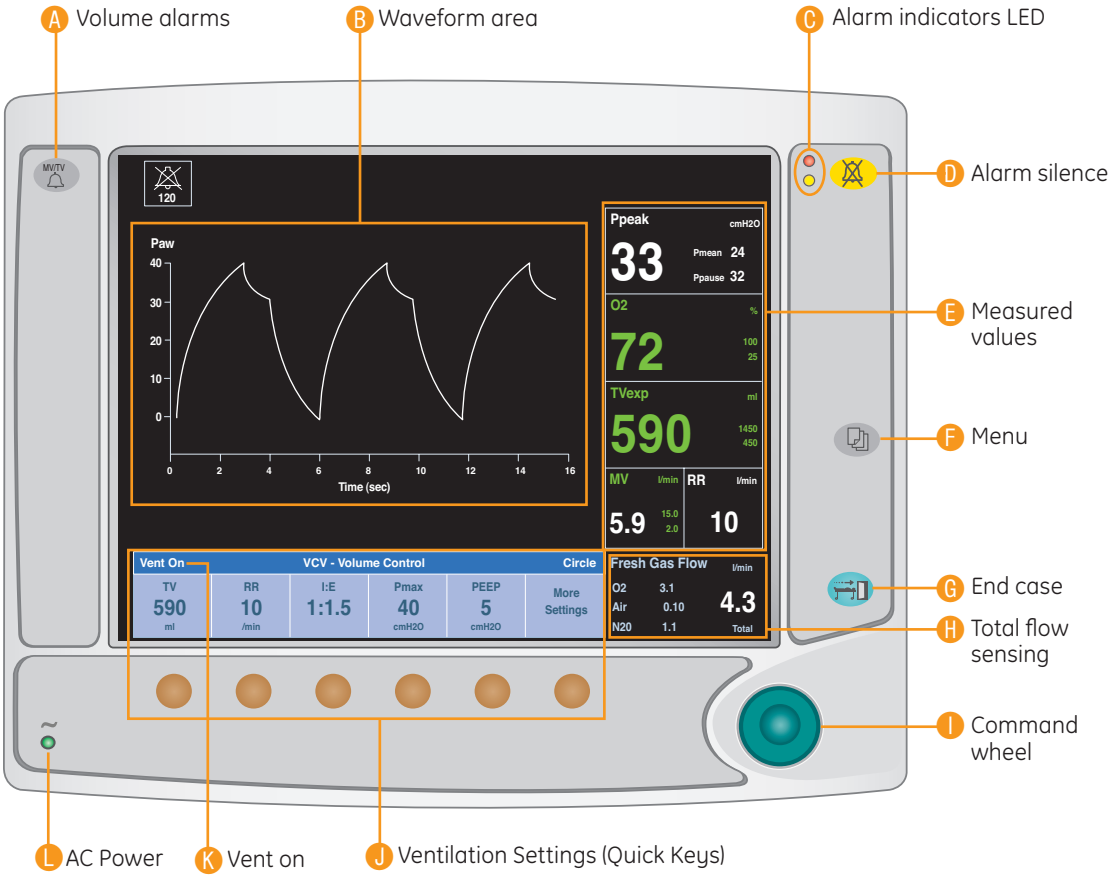


Figure 2.4 Display components

Main Menu

1. Push the ***Menu*** key to show the ***Main Menu***.
2. Turn the ***ComWheel*** counterclockwise to highlight the next menu item. Turn the ***ComWheel*** clockwise to highlight the previous menu item.
3. Push the ***ComWheel*** to enter the highlighted window or a sub menu.
4. Turn the ***ComWheel*** clockwise or counterclockwise to highlight the desired selection.
5. Push the ***ComWheel*** to confirm the selection.
6. Push the ***Menu*** key to exit the menu and return to the normal monitoring screen.

Figure 2.5 Ventilator screen with menu

The Main Menu options will be discussed in greater detail in the Ventilation section. The options that are accessed through the Main Menu include:

Ventilation Mode: Change the current mode of ventilation to a new mode.

Alarm Setup: Change individual alarm limits.

Setup/Calibration: Perform an O_2 sensor calibration and access advanced ventilation settings.

Screen and Audio Setup: Change the audio and visual appearance of the screen.

Cardiac Bypass: Activate and deactivate Cardiac Bypass mode.

Normal Screen: Back to normal view of the display.

Changing Settings Using the Quick Keys

There are two main ways to change a setting using the Quick Keys. The second way is very similar to the first. The only difference is in the last step.

In ***Example one***, we will change the Tidal Volume while in Volume Control Ventilation.

Figure 2.6 Changing Settings Example One

1. Press the ***Quick Key*** associated with Tidal Volume (located just below the Tidal Volume value displayed on the monitor).
2. Turn the ***ComWheel*** to change the setting (turning clockwise increases the level, turning counter-clockwise decreases the level).
3. Press the ***Tidal Volume*** quick key to confirm the new setting.

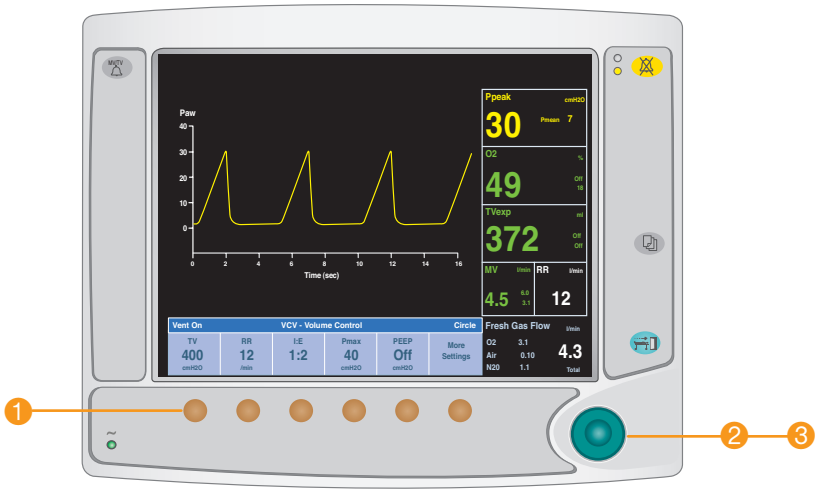


Figure 2.7 Changing Settings Example Two

1. Press the ***Quick Key*** associated with Tidal Volume (located just below the Tidal Volume value displayed on the monitor).
2. Turn the ***ComWheel*** to change the setting (turning clockwise increases the level, turning counter-clockwise decreases the level).
3. Press the ***ComWheel*** to confirm the new setting.

System Switch

Set the System switch to the On (I) position to permit gas flow and turn on the system. The mains indicator will come on when the AC power is connected.

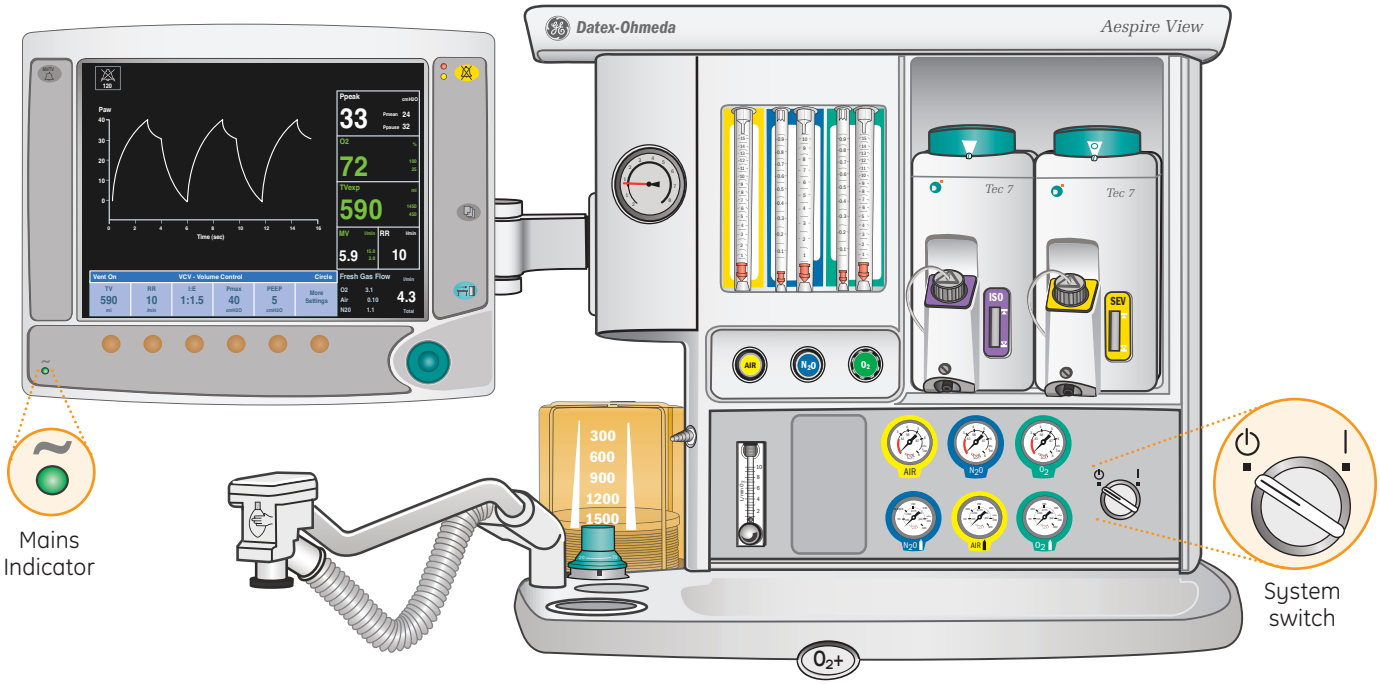


Figure 2.8 System Switch

Battery Capacity

The battery will provide power to the Aespire View for approximately 1.5 hours when fully charged. If the battery is not fully charged, the ***Battery charging*** message will appear on the ventilator display. If the mains supply is not connected or has failed, the message On battery will appear on the ventilator display.

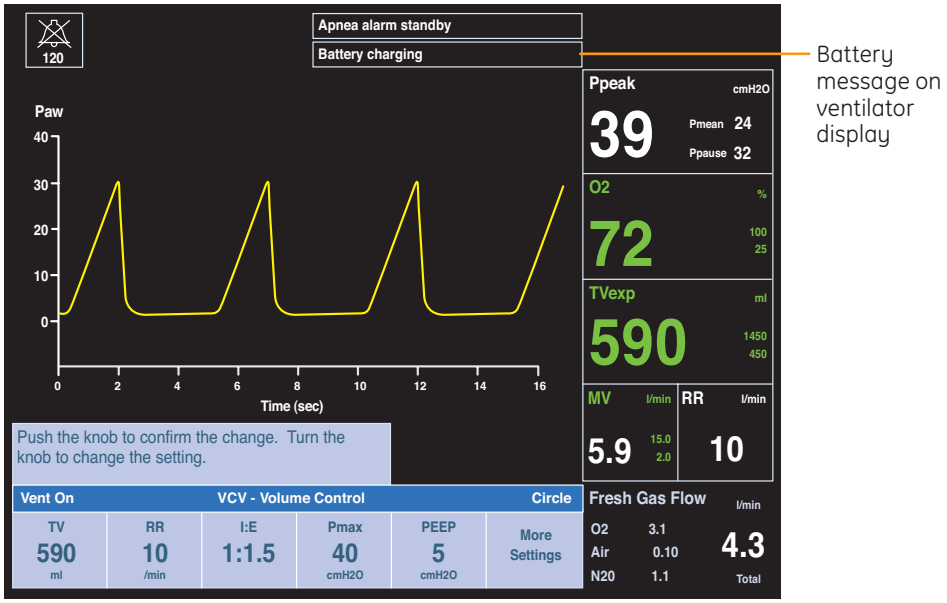


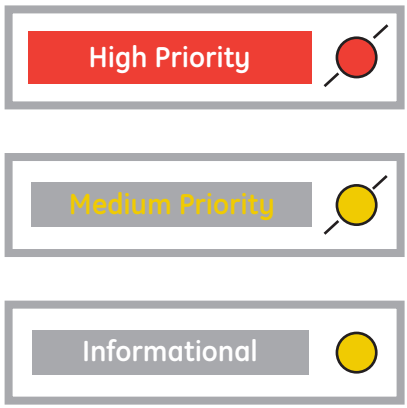
Figure 2.9 Battery message

Alarm Management

Overview

Alarms are divided into technical and parameter alarms, and can be HIGH or MEDIUM priority, or INFORMATIONAL. Technical alarms occur regardless of whether a patient is connected to the system. Parameter alarms are calculated limits, and limits set by you in the Alarm Setup menu. These alarms only occur when a patient is connected.
Silencing an alarm stops the audible tone for 120 seconds. Pushing the Alarm Silence key when no MEDIUM or HIGH priority alarms are active suspends the audible alarm tones for 90 seconds.

Alarm priority is indicated by the color of the alarm message and the alarm LED located next to the alarm silence button.



High priority: White text on red background, red LED flashes

Medium priority: Yellow text on gray background, yellow LED flashes

Informational: White text on gray background, yellow LED solid

Figure 2.10 Alarm Priority

Note! *Refer to your User's Reference Manual, Section 6: Alarms and Troubleshooting for additional alarm information, including ranges and default values, and alarm tests.*

Gas Regulation & Flow Control

O_2 Sensor

The O_2 Sensor, located within the Advanced Breathing System (ABS). The Galvanic Cell measures the circuit O_2. The O_2 sensor is calibrated daily during the system checkout, and can be expected to last approximately 18 months. It CANNOT be disinfected.

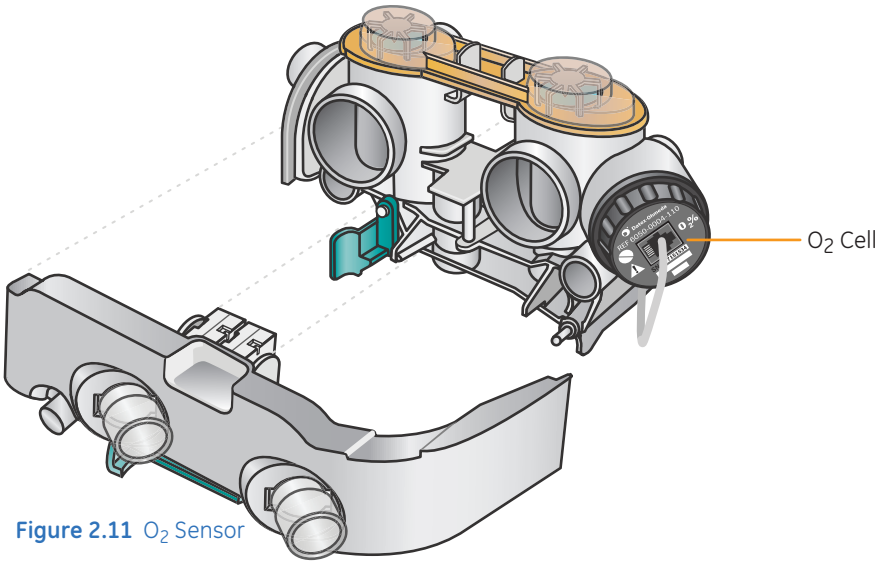


Figure 2.11 O_2 Sensor

21% O_2 Cell Calibration:

1. Push the ***Menu*** key.
2. Select ***Setup/Calibration.***
3. Select ***O_2 Sensor Calibration***.
4. Select ***21% O_2.***
5. Remove the O_2 cell from the circuit.
   - Pull the latch to unlock the flow sensor module
   - Pull the flow sensor module out of the breathing system.
   - Remove the O_2 cell by unscrewing the cell counterclockwise. This exposes the O_2 cell to room air
6. Select ***Start Calibration. Calibrating . . .*** shows on the screen while the O2 cell is being calibrated to the room air.
7. ***Complete*** shows on the screen upon successful calibration:
   - Reinstall the O_2 cell.
   - Select ***Go to Setup/Calibration Menu.***
8. If the screen shows ***Failure***, repeat the 21% O_2 cell calibration.
9. If the calibration fails after another attempt, perform a 100% O_2 cell calibration. Then try the 21% O_2 cell calibration again.
10. Replace the O_2 cell if repeated failures occur.

O_2 Flush Button

The O_2 Flush Button delivers a high flow (35 - 50 L/min) of 100% O_2 to the breathing system, bypassing the vaporizers.

Flow Control Assembly

Turn the flow control knob counterclockwise to increase the flow. Turn the knob clockwise to decrease the flow. The System switch must be On for gas to flow.

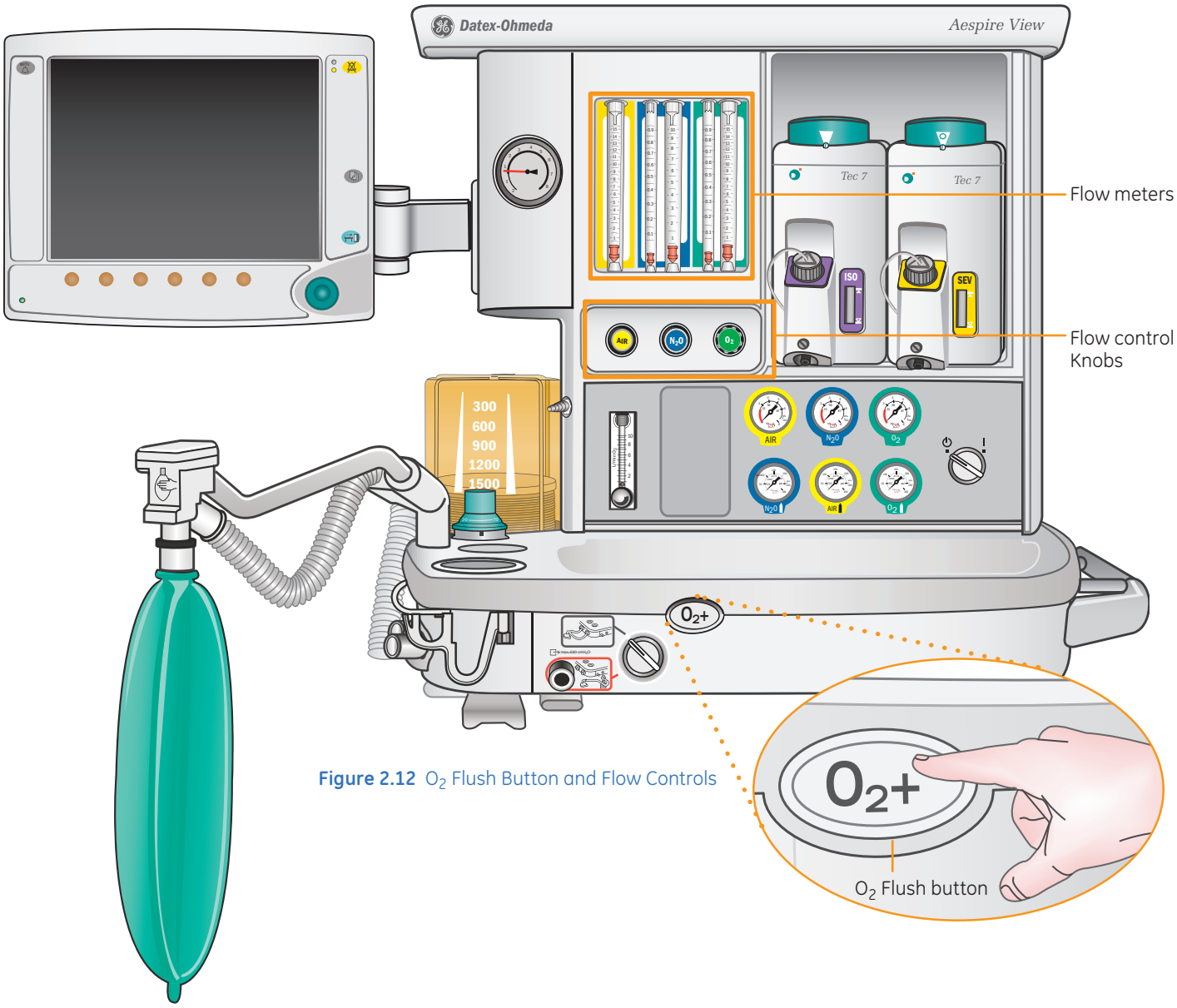
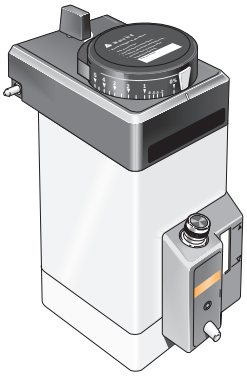
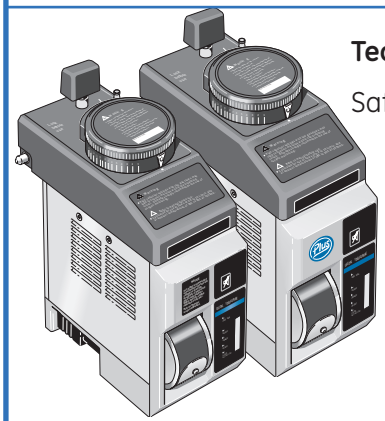


Figure 2.12 O_2 Flush Button and Flow Controls

Vaporization

Types, Mounting & Filling

The Aespire can be configured to hold up to two vaporizers in line. An additional vaporizer can be mounted for storage purposes only. Any of the Tec (temperature compensated) vaporizers can be utilized. We will discuss the Tec 5, 6, 6 Plus and Tec 7 vaporizers.
The Tec 7 includes a new filling mechanism allowing you to rapidly fill the vaporizer while minimizing any spill or airlocks you may have incurred in the past with the key fill type vaporizers.

Tec Series Model and Filling Options:	Anesthetic Agent Options:
 **Tec 5** Funnel fill or key fill	Halothane Red
 **Tec 7** Funnel fill or Easy-fil™	Isoflurane Purple
	Enflurane Orange
	Sevoflurane Yellow
 **Tec 6 and 6 Plus** Saf-T-fill	Desflurane Blue

Selectatec Interlock Mounting System

The Vaporization System uses the Selectatec Interlocking Mounting system, which locks out vaporizers not in use, by directing gas flow past those vaporizers not being used.

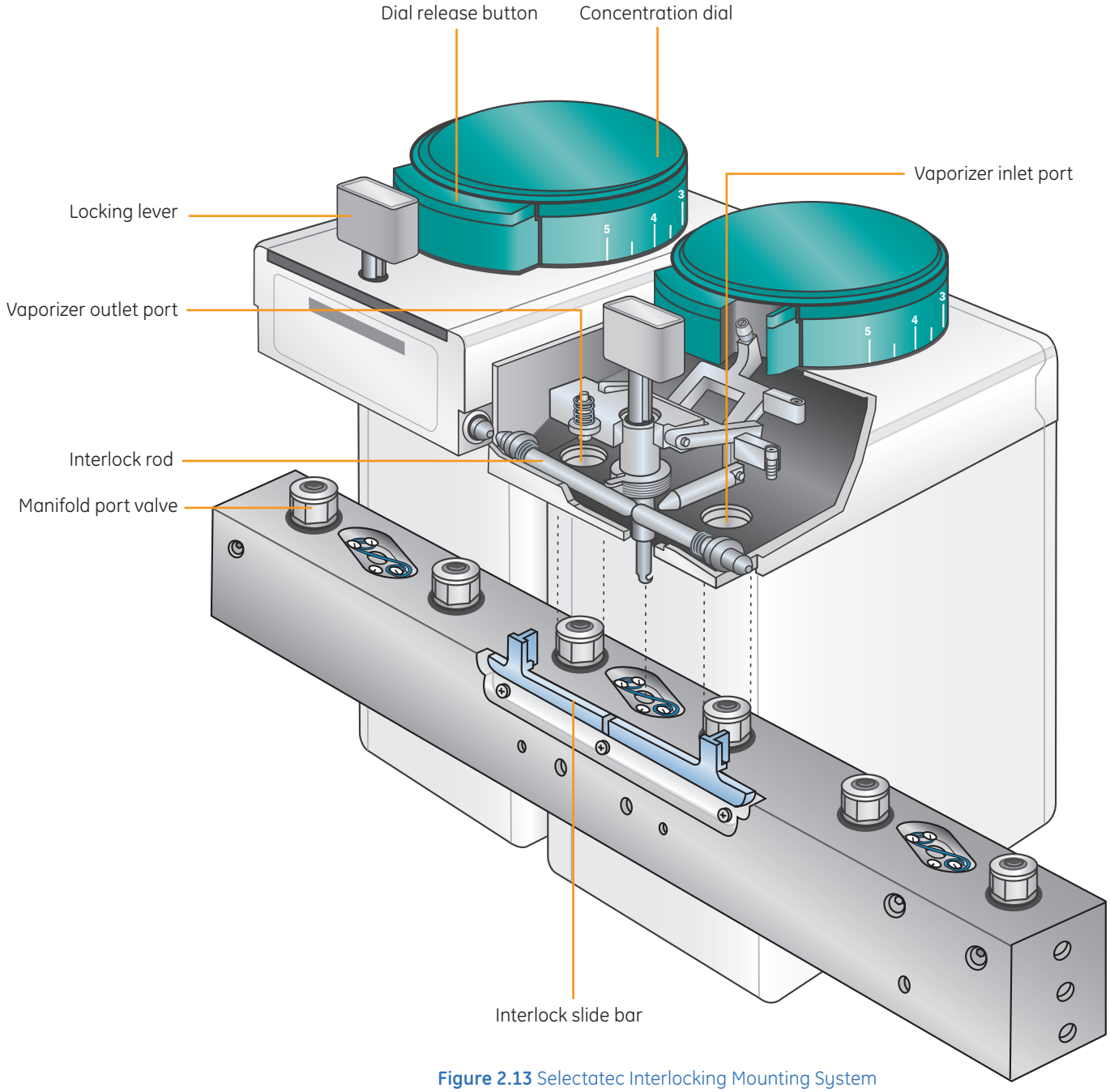


Figure 2.13 Selectatec Interlocking Mounting System

Tec 5 Filling

To Fill the Tec 5 Vaporizer

1. Attach the appropriate (color-coded and indexed) key filler to the agent bottle.
2. Insert the key filler into the vaporizer and lock into place by lowering the vaporizer locking lever.
3. Raise the agent bottle.
4. Release the fill lever on the front of the vaporizer.

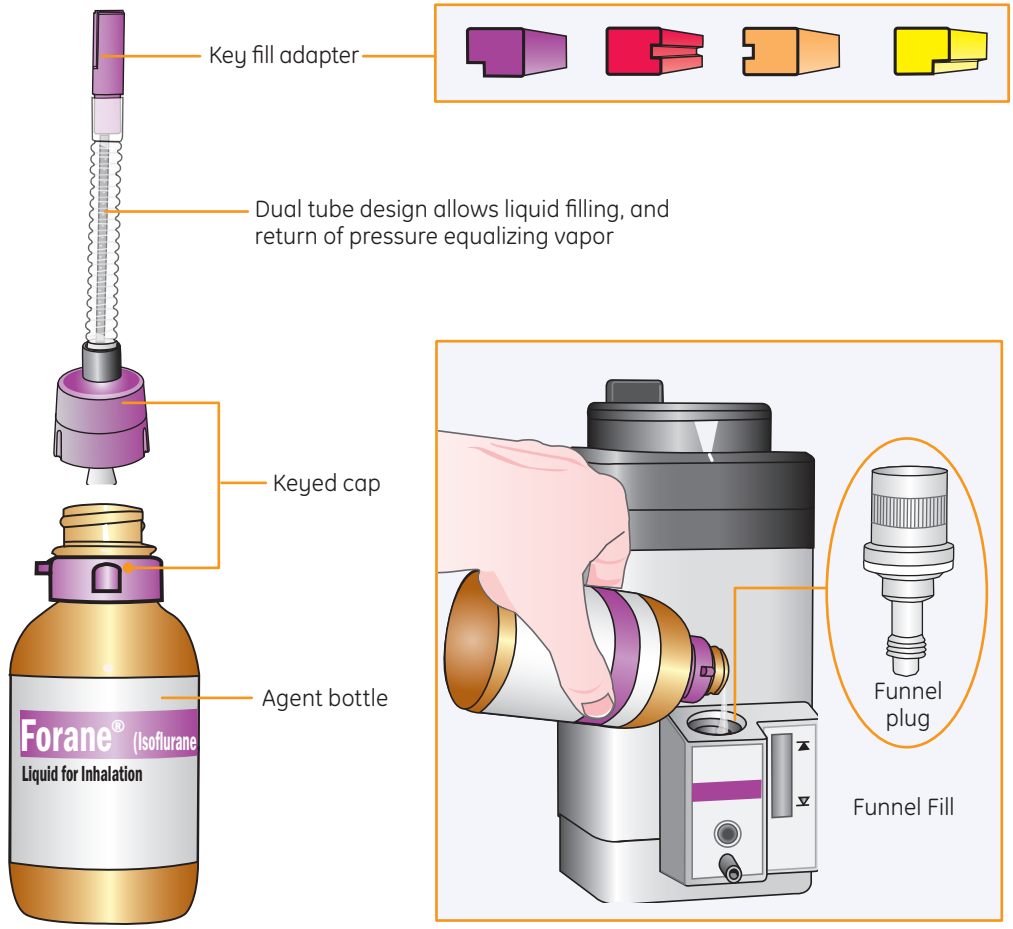


Figure 2.14 Filling a Tec 5 Vaporizer

After Filling the Tec 5 Vaporizer

1. Close the fill lever.
2. Lower the bottle.
3. Unlock and remove the key filler.
4. Remove the key filler for the bottle and recap.

Tec 6 & 6 Plus:

Tec 6 & 6 Plus Vaporizer: For Desflurane (Suprane).

Alarm Mute: Button silences the vaporizer alarm.

Operational LED: Lighted when the vaporizer is plugged into an electrical supply and the agent has warmed to operation temperature. The vaporizer cannot be used until this LED is lighted .

No Output LED: Lights when there is no agent or during a malfunction of the vaporizer.

Low Agent LED: Lights when the agent is too low for reliable output

Warm-Up LED: Lights during power-up and locks out the vaporizer until the operational temperature is reached.

Alarm Battery Low LED: Lights when the vaporizer alarm battery (9 volt) needs to be changed.

Fill Indicator: LCD that displays the fill level. There are icons for Low and Full as well as an arrow icon that indicates at what level the vaporizer will accept a full bottle of Desflurane.

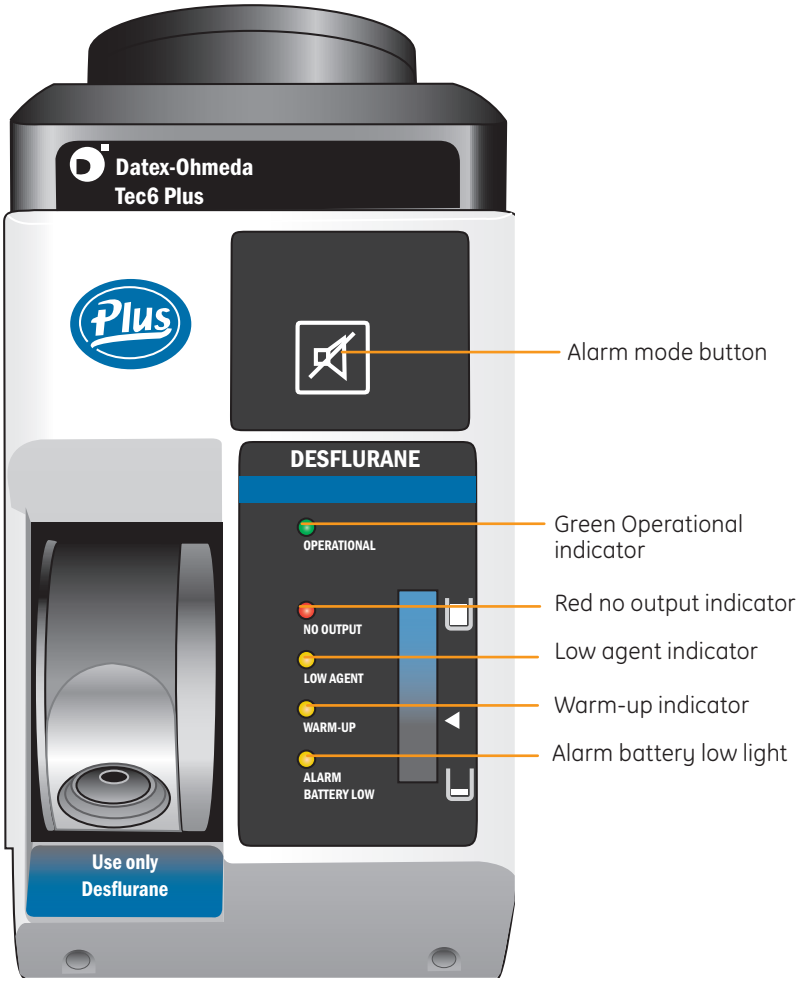


Figure 2.15 Tec 6 & 6 Plus Vaporizer

Tec 6 & 6 Plus Filling

Filling the Tec 6 vaporizer

1. Uncap the Desflurane bottle and insert into the vaporizer fill port (twisting and turning while inserting the bottle may prevent the o-rings from damage or misalignment).
2. Raise the bottle to fill the Tec 6 vaporizer. The bottle should raise easily, if not, the bottle is not inserted far enough.

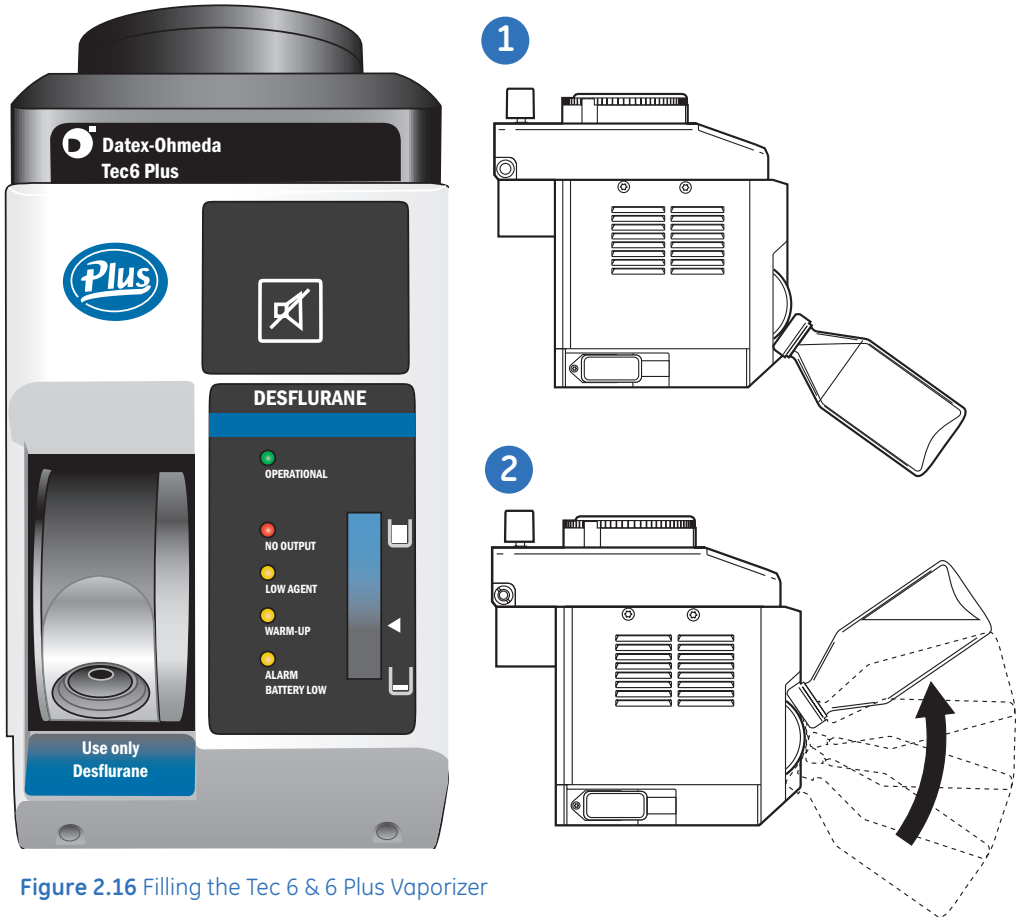


Figure 2.16 Filling the Tec 6 & 6 Plus Vaporizer

After Filling the Tec 6 vaporizer

1. Lower the Desflurane bottle and remove as described above for insertion.
2. Recap the Desflurane bottle.

Tec 7 and Easy-Fil™ Adapters

The Tec 7 vaporizer utilizes an Easy-fil Adapter system. Easy-fil Adapters are easy to use, color coded and key indexed. This system replaces the Key filler system.

Filling the Tec 7 vaporizer

1. Uncap the agent bottle and attach the Easy-fil adapter.
2. Unscrew the fill connection cap from the vaporizer.
3. Invert the bottle and insert the Easy-fil adapter into the vaporizer. It may be necessary to turn the bottle until it drops to its lowest position.
4. Press and hold the bottle down until the vaporizer is filled. Air bubbles in the bottle will indicate that agent is flowing into the vaporizer.

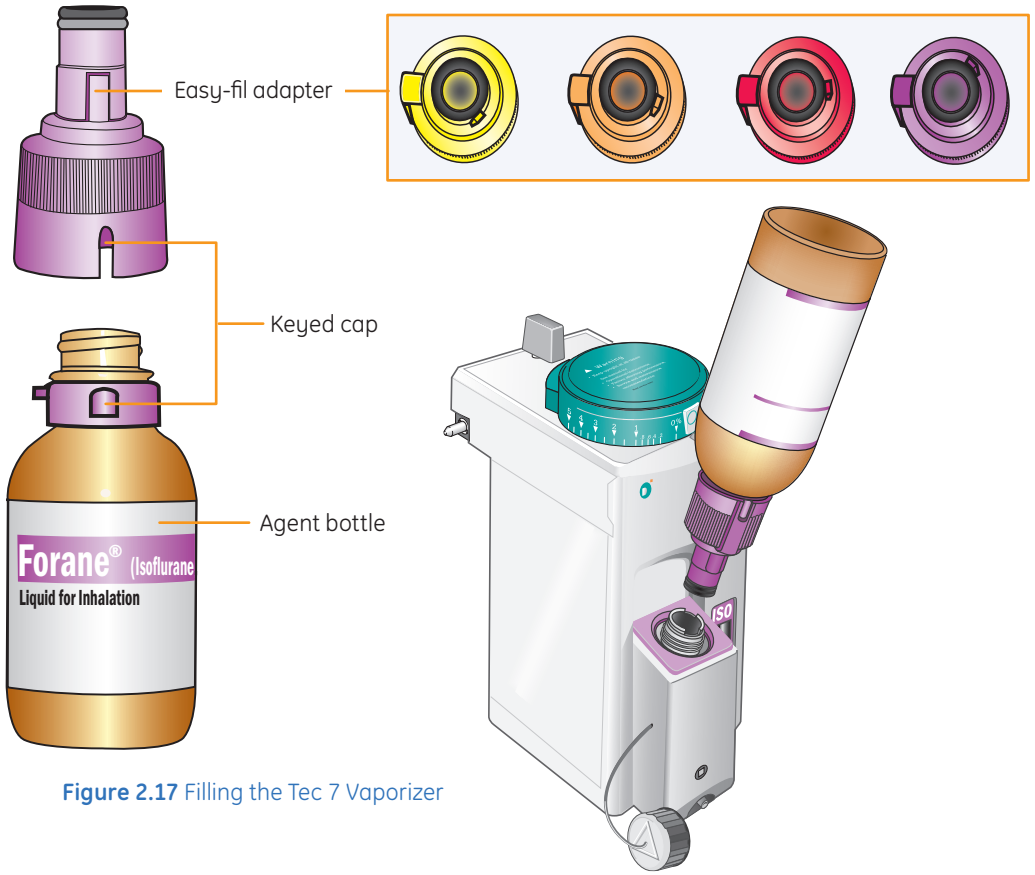


Figure 2.17 Filling the Tec 7 Vaporizer

After Filling the Tec 7 vaporizer

1. Remove the bottle from the vaporizer and remove the Easy-fil Adapter.
2. Recap the agent bottle and the vaporizer.

Gas Management & Scavenging

Advanced Breathing System

The Aespire View includes the Advanced Breathing System (ABS).

The ABS is a small compact system with a 2.7L circuit vent volume designed for low flow anesthesia. It also allows for rapid control of fresh gas flows and concentrations. Changes to fresh gas concentration are applied at the next breath, which allows for the quick administration and removal of agent from the system.

Fresh gases are delivered just behind the inspiratory check valve and then immediately delivered into the inspiratory limb of the breathing circuit. Any changes to fresh gas concentration or flows are immediately delivered to the patient, which gives you rapid control of fresh gas flows and concentrations at the point where it matters, the patient.

The ABS is autoclavable (except for the plastic flow sensors and O_2 sensor), allowing you to rapidly disassemble it, autoclave it, and reassemble the breathing system because it does not retain heat. You can assemble it quickly and return it to service -ready for the next case.

The ABS is entirely latex free. There are no cables and hoses, which minimizes improper connections or disconnects, and can integrate either passive or active scavenging systems.

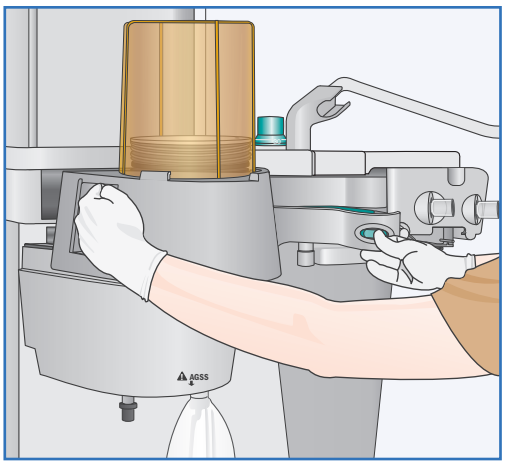


Figure 2.18 Removing the Breathing System

Figure 2.19 Aespire Advanced Breathing System

Bag/Vent Switch

The Bag/Vent Switch is a bistable mechanical switch that selects between manual ventilation (bag) and mechanical ventilation (vent). When the switch is changed from bag to vent mode, the ventilator is automatically switched ON.

Be sure to check the ventilator parameters before changing from bag to vent mode. Also keep in mind that the APL Valve is not in the circuit while the ventilator mode is active.

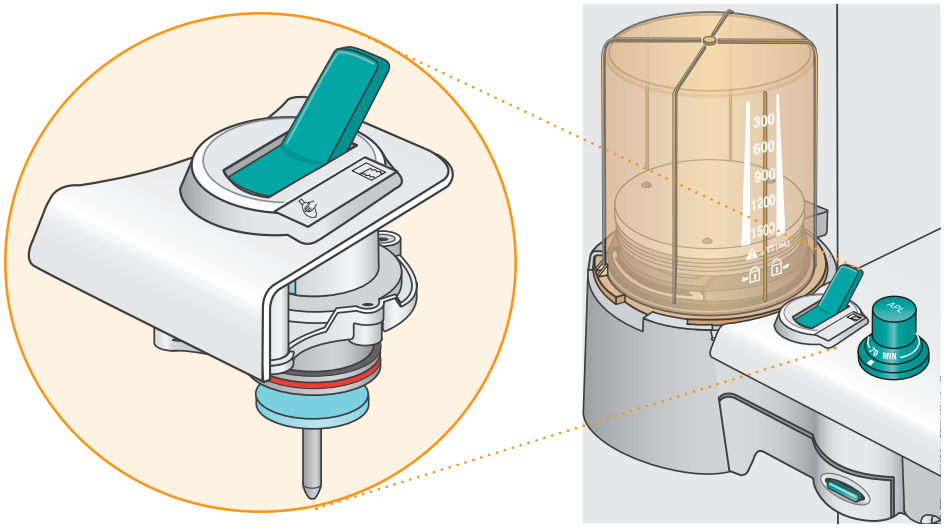


Figure 2.20 Bag/Vent Switch

APL Valve

The APL Valve allows you to change the settings from minimum to 70 cmH_2O. When the APL is between 30 and 70 cmH_2O, you will notice that the valve becomes a tactile indicator, meaning that the knob clicks at each additional cmH_2O.

Note! *There is no need for a quick release valve because the APL can go from 70 cmH_2O to minimum with one turn.*

At minimum – there are 2-3 cm of Intrinsic PEEP, caused by resistance of flow in the system.

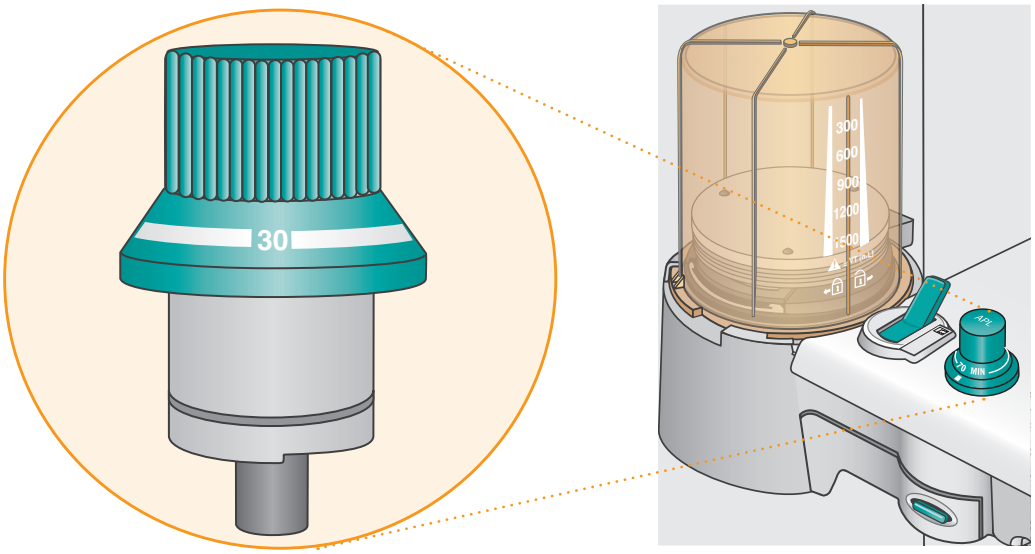


Figure 2.21 APL Valve

Bag Support Arm

The ABS also provides for the use of a Bag Support Arm. This bag arm is different than traditional anesthesia systems because it does not actually carry patient gas. Patient gas is carried through the bag arm hose from the ABS out to the bag. This allows ultimate control of the position of the bag arm as well as of the bag itself.

The Bag Support Arm ensures that the bag is readily available and attaches quickly to the arm. The bag can be used while attached to or detached from the bag support arm.

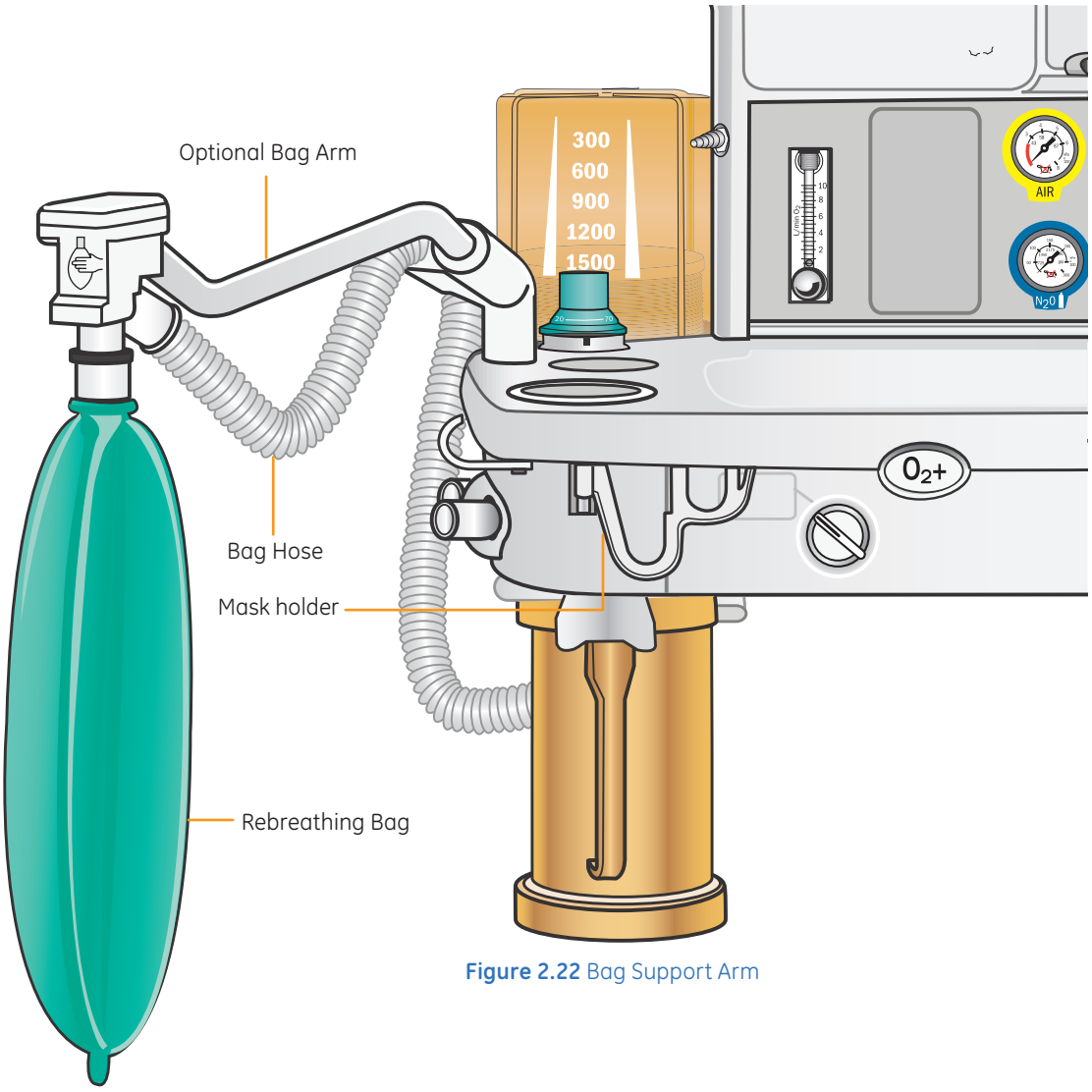


Figure 2.22 Bag Support Arm

Absorber Canister

The canisters hold 950 ml and are available as disposable or reusable. The reusable canister is autoclavable. The Advanced Breathing System also includes an ***EZChange*** option for the canister. The EZChange sealing component seals the system so you can replace the canister without introducing a leak into the system, and ***CO_2 Absorber Out of Circuit*** will appear in the waveform area of the anesthesia display. Both disposable and reusable canisters can be used with the EZChange option.

These canisters can be exchanged simply by pushing on the teal-colored release latch and disconnecting the canister, removing it for replacement.

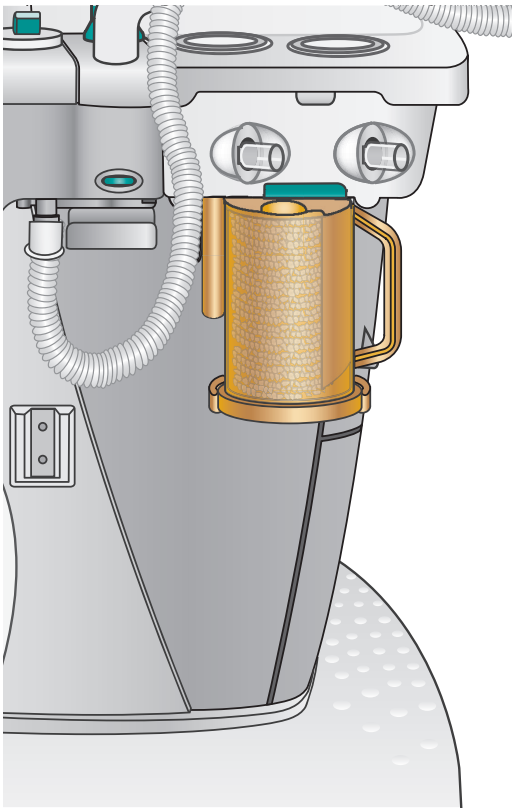


Figure 2.23
Canister on Standard Machine

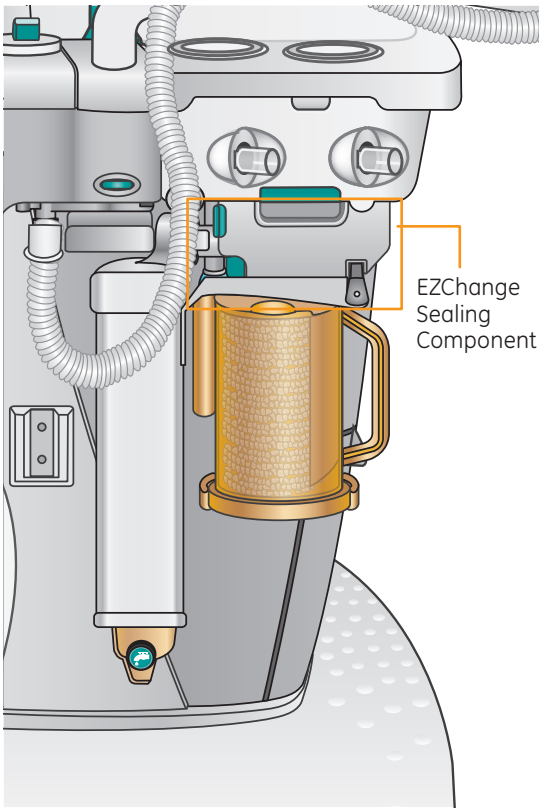


Figure 2.24
Canister on Machine with EZChange Option

Canister Access on a Standard Machine

To remove a canister on a standard system:

1. Hold the canister by the handle.
2. Push the Absorber Canister Release.
3. Push it down and away from the attachment point/support pins to remove the canister.

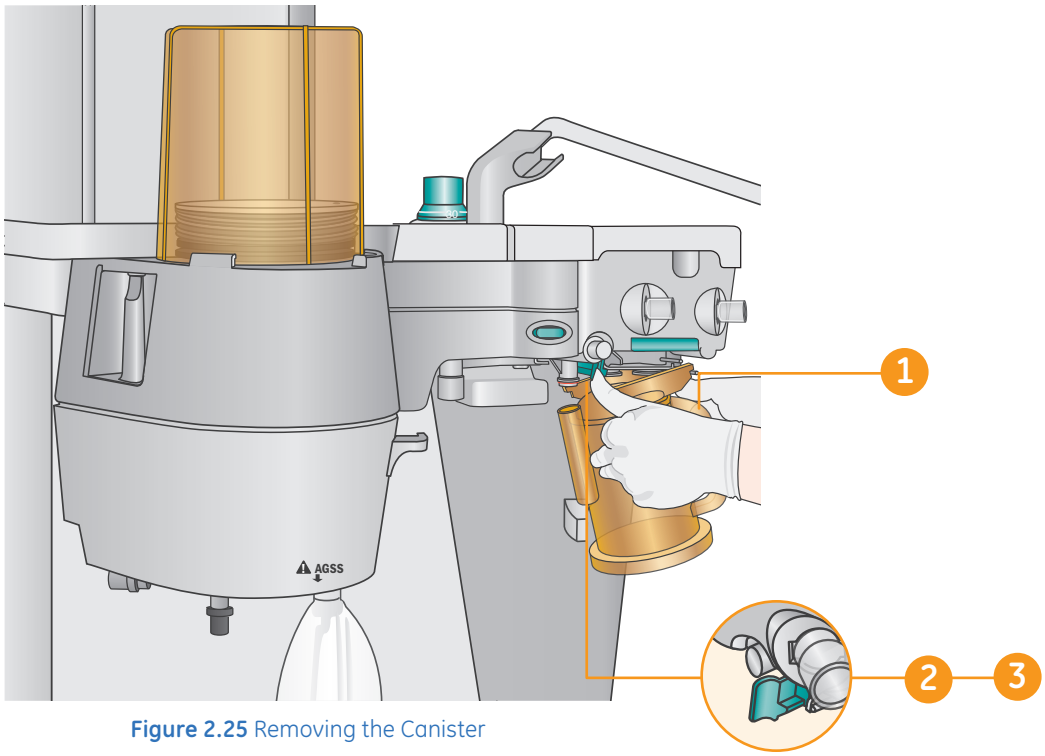


Figure 2.25 Removing the Canister

To replace a canister on a standard system:

1. Hold the canister by the handle.
2. Tilt the canister down and place the lip of the canister so that it catches at its attachment point/support pins.
3. Push the other side of the canister up until you hear it snap into place.

Canister Access on a Machine with the EZchange Option

To remove a canister on a system with the EZChange option:

1. Hold the canister by the handle.
2. Push the Absorber Canister Release to unlock the canister cradle.
3. Tilt the Cradle down, and slide the canister up and out of the cradle.

Note! *If the EZChange sealing component is not present, when the canister is removed the system is open. It does not self-seal; you do have a leak within the patient circuit until the canister is replaced.*

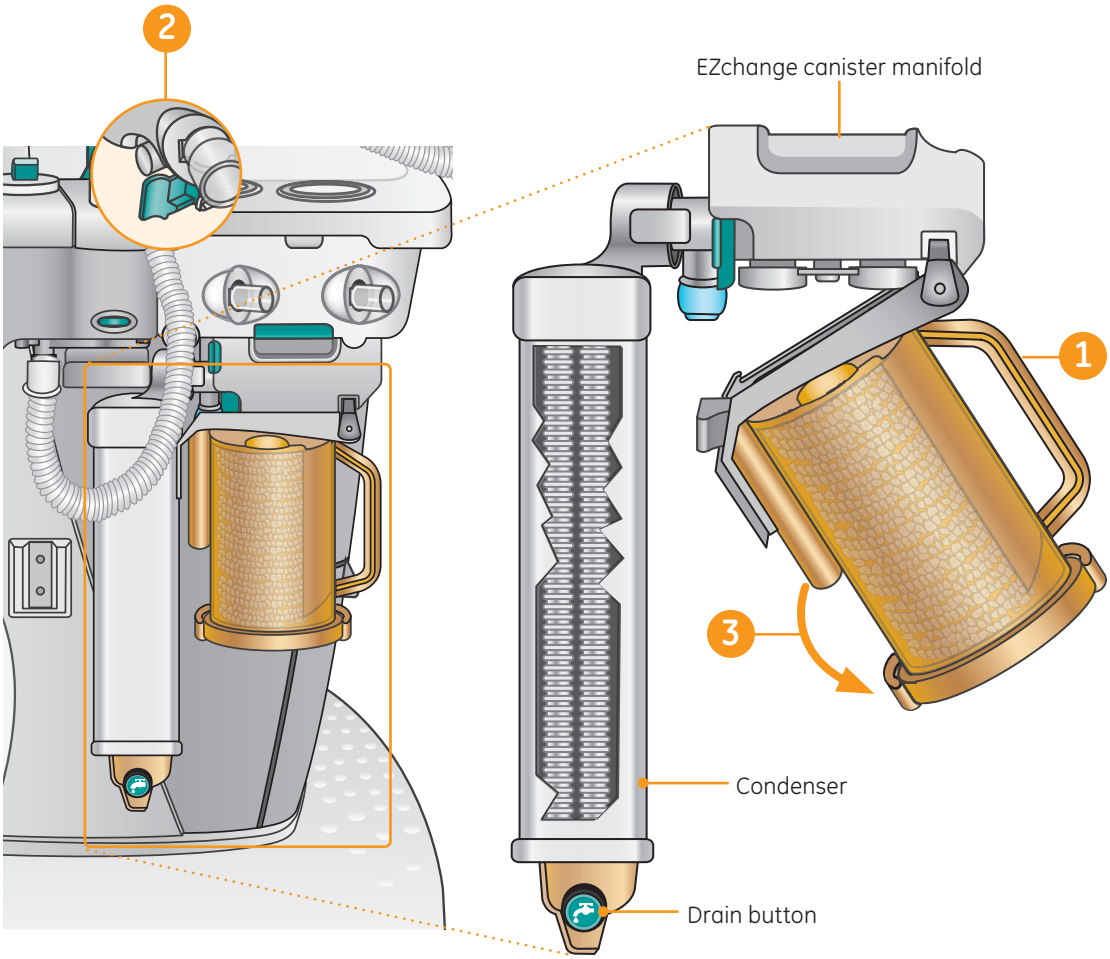


Figure 2.26 Canister on Machine with EZChange Option

To replace a canister on a system with the EZChange option:

1 Hold the canister by the handle.
2. Slide the canister into the cradle.
3. Tilt the cradle up to lock into place.

Condenser

The condenser is an optional component that may be used alone or in addition to the EZChange canister. Gas flows from the absorber canister through the condenser, where it allows moisture to condense out of the gas before entering the inspiratory limb. This moisture is then drained out at the bottom of the condenser, and should be attended to. The condenser adds 715 ml of volume to the breathing system.

Note! *Visually check the condenser reservoir daily, and drain if needed.*

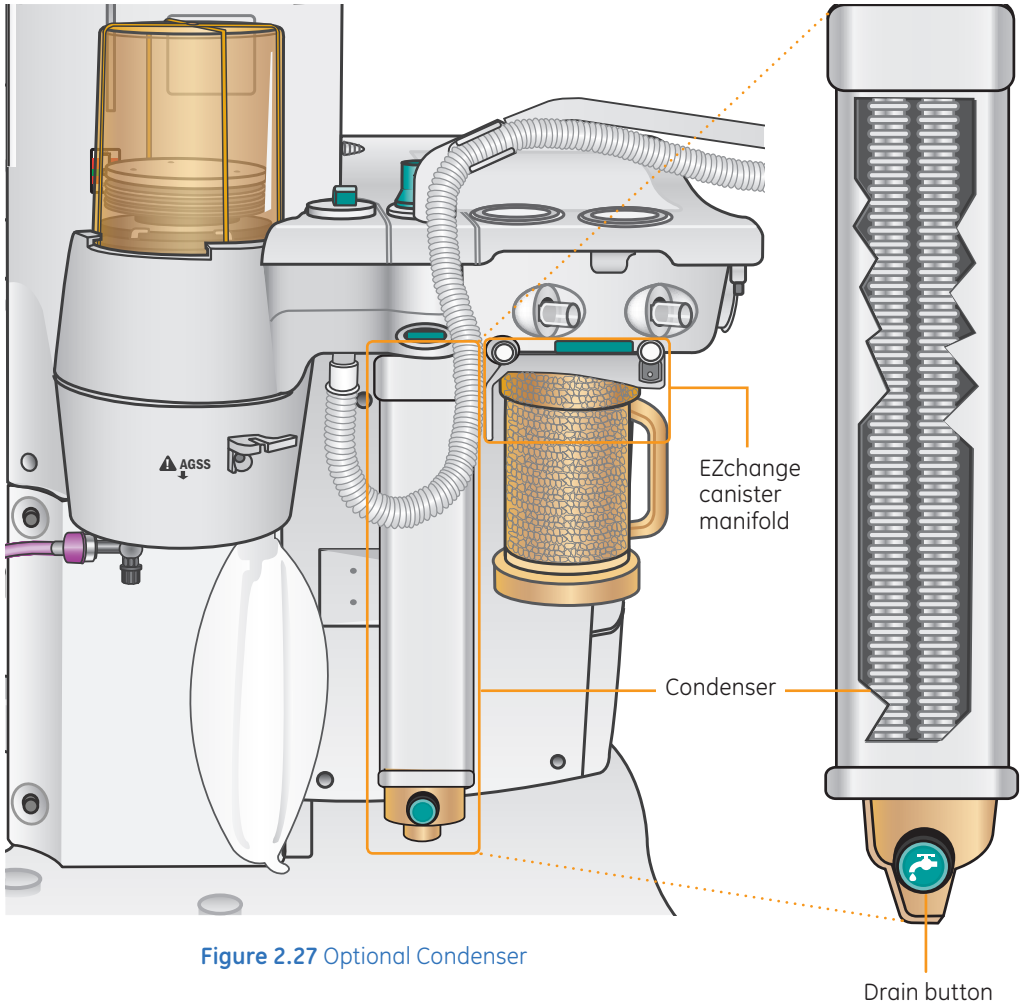


Figure 2.27 Optional Condenser

Flow Sensors

Flow Sensors are differential pressure pneumotachs that measure inspiratory pressures and both inspiratory and expiratory volumes. Removing the Flow Sensor Module while the Aespire View is powered ON zeros the pressure transducers.

The Flow Sensors are either plastic or metal. The plastic Flow Sensors may be sterilized using only liquid or gas methods. The metal Flow Sensors may be sterilized using liquid, gas or steam autoclave methods.

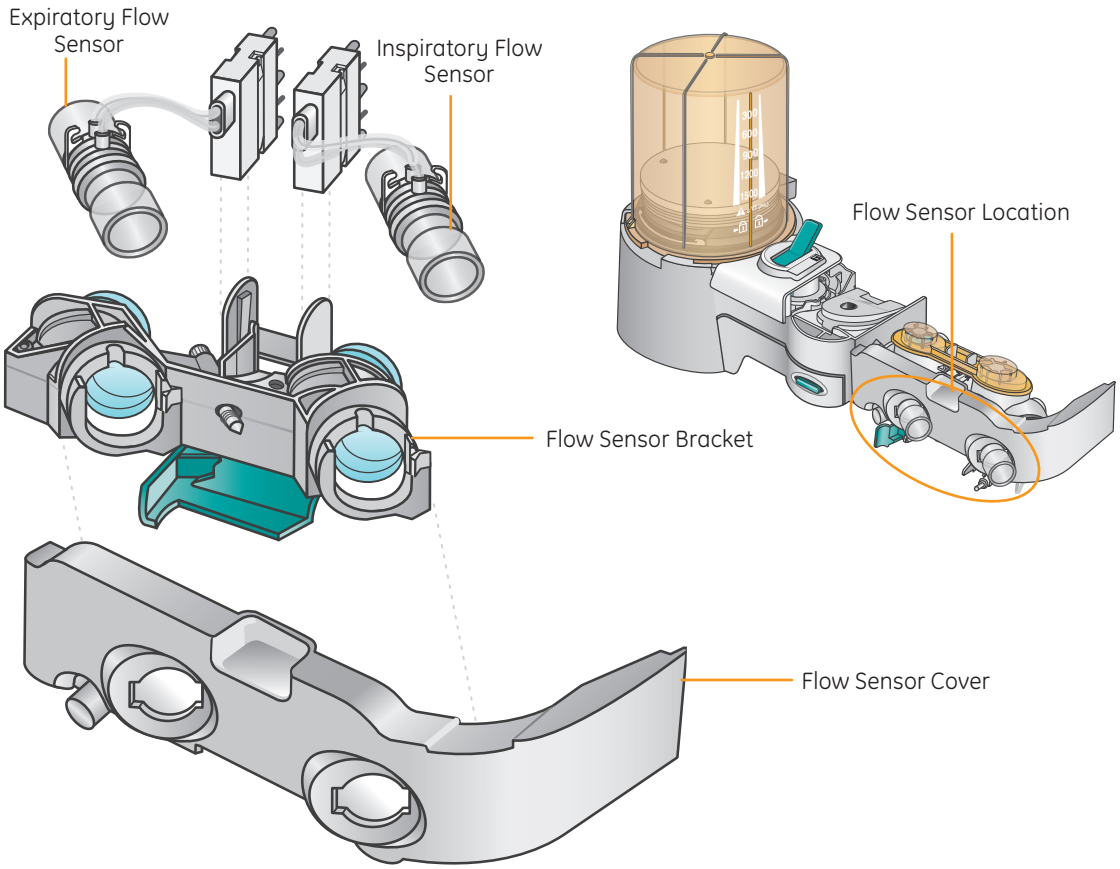


Figure 2.28 Flow Sensors

Auxiliary Common Gas Outlet (ACGO)

The Auxiliary Common Gas Outlet (ACGO) is not required for operation of the Aespire View. A negative pressure leak test can be accomplished through the ACGO.

Set the switch to ACGO position to have fresh gas flow through the ACGO port. The ACGO may be used to provide fresh gas to an auxiliary manual breathing circuit, such as a Mapleson or Jackson-Rees circuit.

Note! *Mechanical ventilation is not available when operating an auxiliary manual breathing circuit with fresh gas from the ACGO. Volume and pressure monitoring are also not available.*

*The messages **ACGO on** and **Pressure/volume monitor inactive** will be displayed when the ACGO switch is activated.*

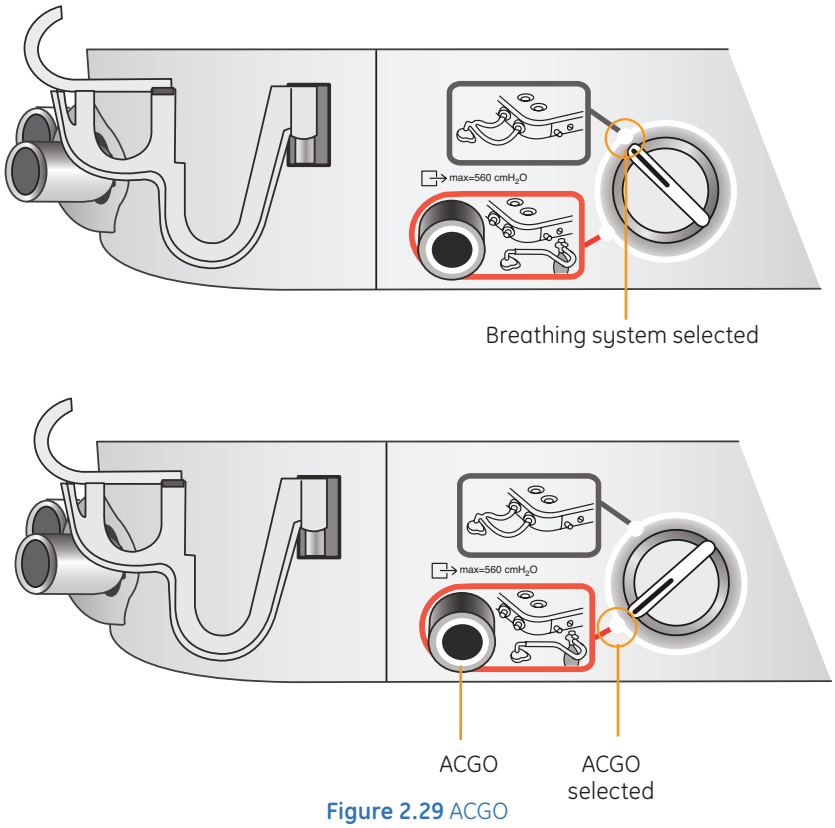


Figure 2.29 ACGO

Types of Scavenging Systems

Passive AGSS (Anesthetic Gas Scavenging System):

- Mainly used in operating rooms with no active gas extraction system for waste gas disposal
- Includes positive and negative pressure relief valves
- Outlet is a 30mm connector at bottom of scavenger
- Large tubing directly links the passive AGSS with building exterior

Note! *A 30 mm passive scavenging hose is also available that does not require the purple adapter.*

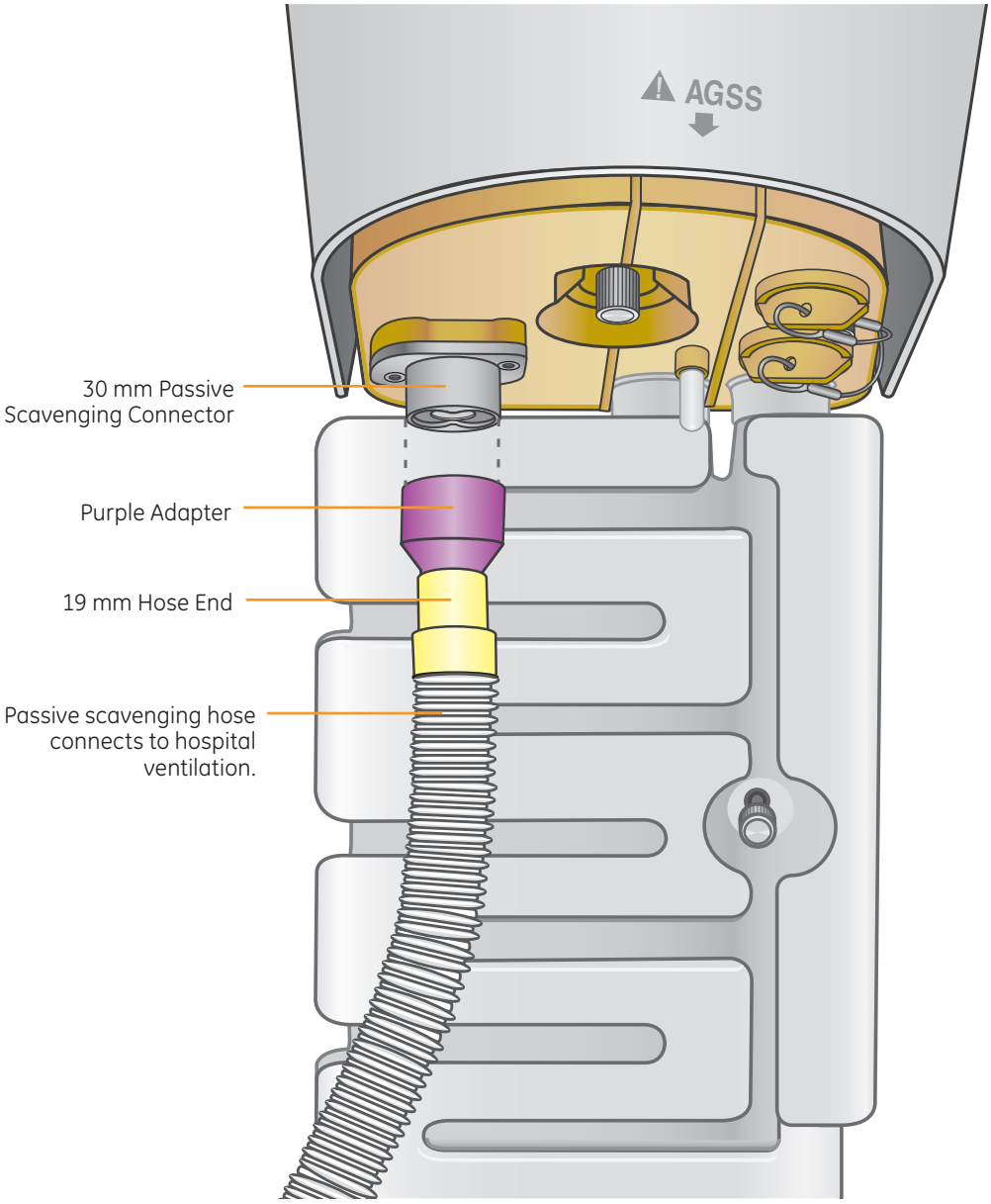


Figure 2.30 Passive Anesthetic Gas Scavenging System

Active Systems:

- **Open Reservoir System:** Used with high vacuum (36 L/min) disposal systems. No needle valve or visual indicator bag required. Visual flow indicator present.
- **Active Adjustable Flow:** Provides the capability to adjust the flow with a needle valve and a visual indicator bag which should be properly inflated. To ensure adequate scavenging, adjust the needle valve so the visual indicator bag puffs out slightly with each breath. The bag should not be completely collapsed (close the needle valve slightly) nor completely inflated (open the needle valve slightly.)

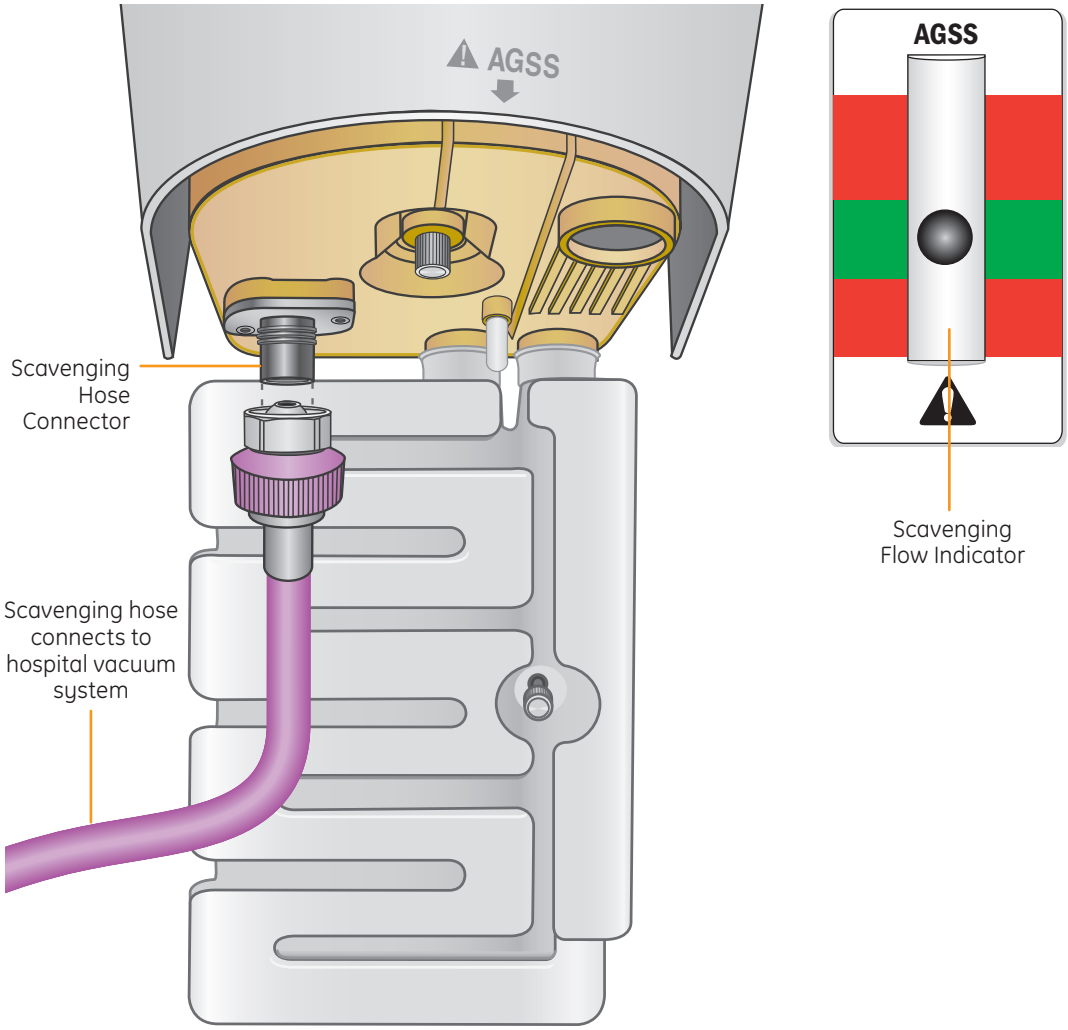


Figure 2.31 Active Scavenging Connector

- Problems with Active Adjustable Flow gas scavenging can cause a “High Peep” alarm. Make sure the scavenge hose is connected to suction. Make sure that the needle valve is open enough that the scavenger bag moves with inspiration and expiration.

You can connect the sample gas exhaust tube to the gas return port. Exhaust gas will be directed to the scavenging system.

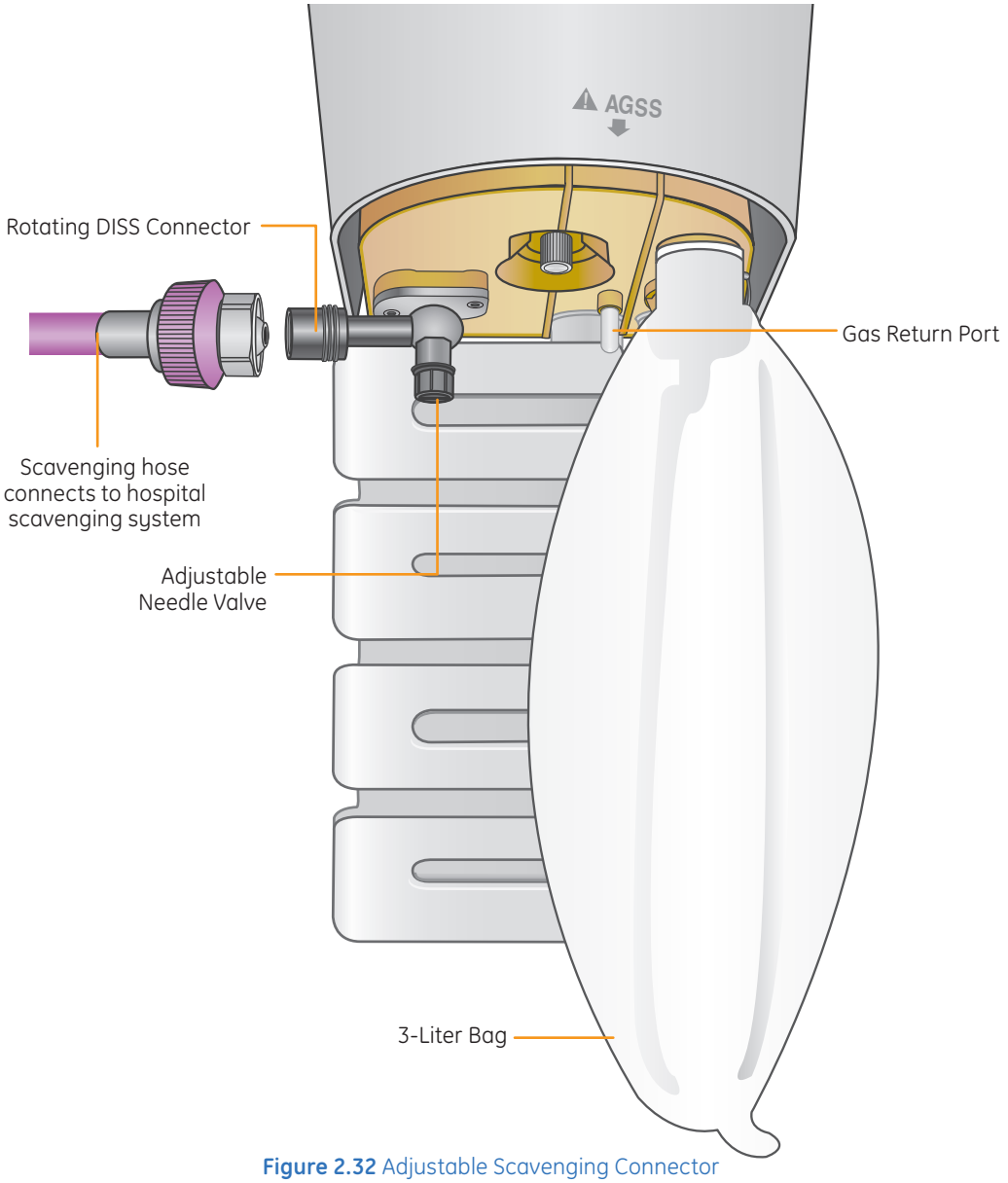


Figure 2.32 Adjustable Scavenging Connector

System Checkout

Every Day Before the First Patient

1. Check that necessary emergency equipment is available and in good condition.
2. Check that the equipment is not damaged and that components are correctly attached.
3. Check that pipeline gas supplies are connected and cylinders are installed and adequately filled.
4. Check the system suction connections.
5. Check the vaporizer installation:
   - The top of each vaporizer is horizontal (not on crooked)
   - Each vaporizer is locked and cannot be removed
   - The alarms and indicators operate correctly (Tec 6 series vaporizers)
   - More than one vaporizer cannot be turned on at the same time
   - All vaporizers are full
6. Check that the breathing circuit is correctly connected, not damaged, and the breathing system contains sufficient absorbent.
7. Turn the System switch to On.
8. Connect the scavenging and verify proper operation.
9. Do the Pipeline test and Cylinders test.
10. Do the Flow control tests.
11. Do the Vaporizer back pressure tests.
12. Do a Low-pressure leak test.
13. Do the Alarm tests.
14. Do the Breathing system tests.
15. Set the appropriate controls and alarm limits for the case.

Note! *After completing a System Checkout, always return the APL to the fully open position (MIN).*

Before Every Patient

Note! *This check does not need to be done before the first case of the day if the* ***Every Day Before The First Patient*** *check was done.*

1. Check that necessary emergency equipment is available and in good condition.
2. Check the vaporizer installation:
   - The top of each vaporizer is horizontal (not on crooked).
   - Each vaporizer is locked and cannot be removed.
   - The alarms and indicators operate correctly (Tec 6 series vaporizers).
   - More than one vaporizer cannot be turned on at the same time.
   - All vaporizers are full.
3. Do the Breathing system tests.
4. Set the appropriate controls and alarm limits for the case.

Test Procedures

Pipeline Test

1. Disconnect the pipeline supplies and close all cylinder valves.

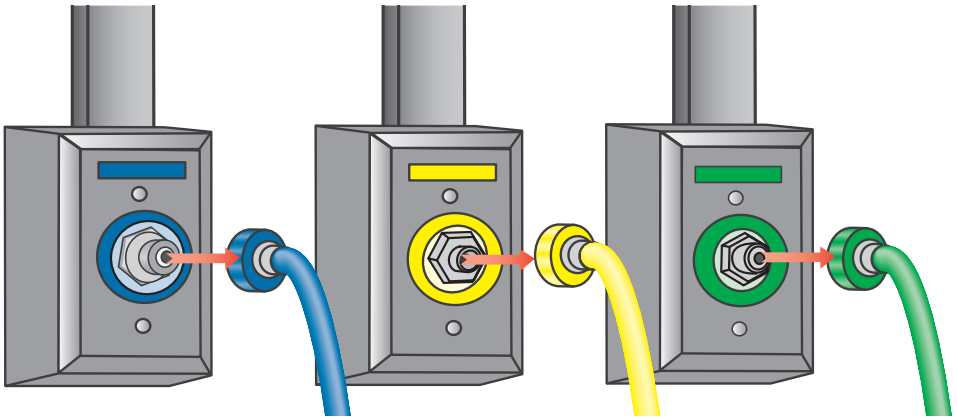


Figure 2.33 Disconnect the pipeline supply

2. If the pipeline and cylinder pressure gauges are not at zero.
   - Connect an O_2 supply
   - Set the System switch to ***On***
   - Set the flow controls to mid range.
   - Make sure that all of the gauges except for O_2 go to ***zero***
   - Disconnect the O_2 supply
   - Make sure that the O_2 gauge goes to zero. As the pressure decreases, the alarms for O_2 supply failure should occur.
3. Connect the pipeline supplies.
4. Verify the pipeline pressure is between 41-87 psi (280-600 kPa).

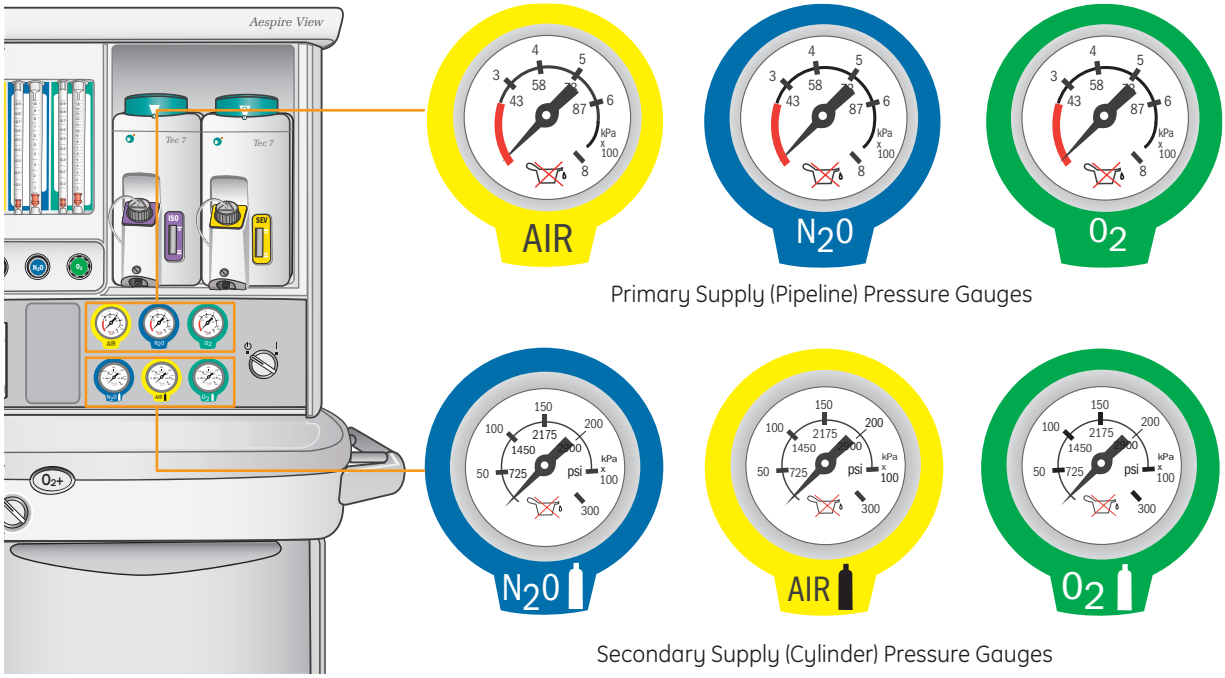


Figure 2.34 Pressure Gauges

Cylinder Test

1. Disconnect the pipeline supplies and close all cylinder valves.
2. If the pipeline and cylinder pressure gauges are not at zero:
   - Connect an O_2 supply
   - Set the System switch to ***On***
   - Set the flow controls to mid range
   - Make sure that all of the gauges except for O_2 go to ***zero***
   - Disconnect the O_2 supply
   - Make sure that the O_2 gauge goes to zero. As the pressure decreases, the alarms for O_2 supply failure should occur
3. Make sure that the cylinders are full.
   - Open each cylinder valve
   - Make sure that each cylinder has sufficient pressure
   - If the cylinder does not have sufficient pressure, close the cylinder valve and install a full cylinder
4. Set the System switch to ***Standby***.
5. Turn off the auxiliary O_2 flowmeter (if equipped).
6. Turn off the suction (if equipped).
7. Test one cylinder at a time for high-pressure leaks.
   - Open the cylinder
   - Note the cylinder pressure
   - Close the cylinder valve
   - Wait for one minute and record the cylinder pressure again
   - If the cylinder pressure for Air or O_2 decreases more than 690 kPa (100 psi), there is a leak
   - If the cylinder pressure for N_2O decreases more than 690 kPa (100 psi), there is a leak

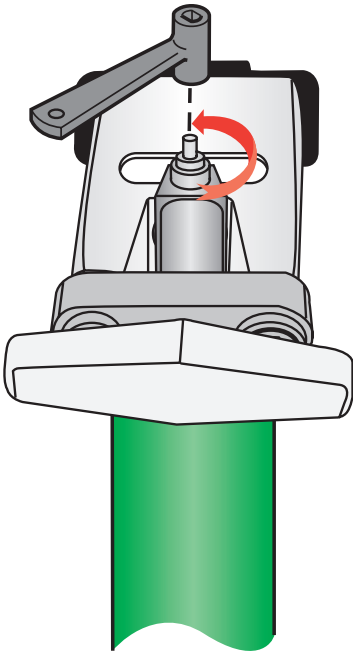


Figure 2.35 Close cylinders

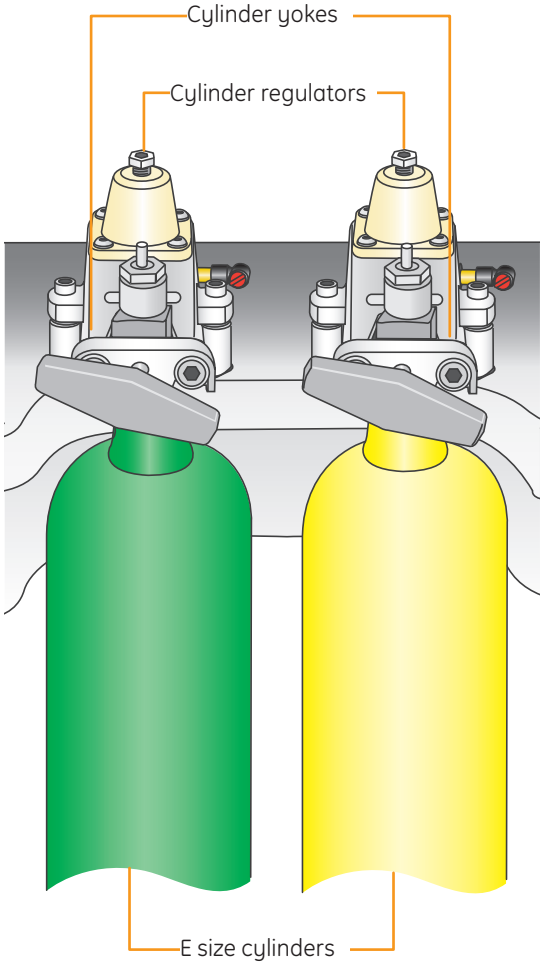


Figure 2.36 Cylinders

Flow Control Test:

1. Connect the pipeline supplies or slowly open the cylinder valves.
2. Turn all flow controls fully clockwise for minimal flow.
3. Set the ACGO switch to ***ABS.***
4. Set the System switch to ***On.***
5. Make sure that the O_2 flow tube shows approximately 0.025 to 0.075 l/min.
6. Test the Link-25 system by increasing the N_2O flow.
   - Slowly turn the N_2O flow control counterclockwise
   - Increase the N_2O flow as specified in the following table and make sure the O_2 flow is as specified in the following table:

N_20 flow l/min	O_2 flow greater than l/min
0.8	0.2
2	0.5
4	1.0
10	2.5

7. Test the Link-25 system with O_2 flow decreasing.
   - Set the N_2O flow to 9 l/min
   - Set the O_2 flow to 3 l/min or higher
   - Slowly turn the O_2 flow control clockwise. Set the N_2O flow to the rates shown in the following table:

N20 flow l/min	O_2 flow greater than l/min
8	2
4	1
0.8	0.2

8. Adjust the flow of all gases through the full range and make sure that the flow tube floats move smoothly.
9. Disconnect the O_2 pipeline supply or close the O_2 cylinder valve.

Note! *Nitrous oxide (N_2O), if available, flows through the system during this test. Use a safe and approved procedure to collect and remove the N_2O.*

10. Make sure that:

- The low O_2 supply alarm occurs
- The N_2O and the O_2 flows stop. The O_2 flow should stop last
- The air flow continues (if equipped)
- The gas supply alarms occur on the ventilator if the ventilator uses O_2 as the drive gas

11. Turn all the flow controls fully clockwise for minimum flow.

12. Reconnect the O_2 pipeline supply.

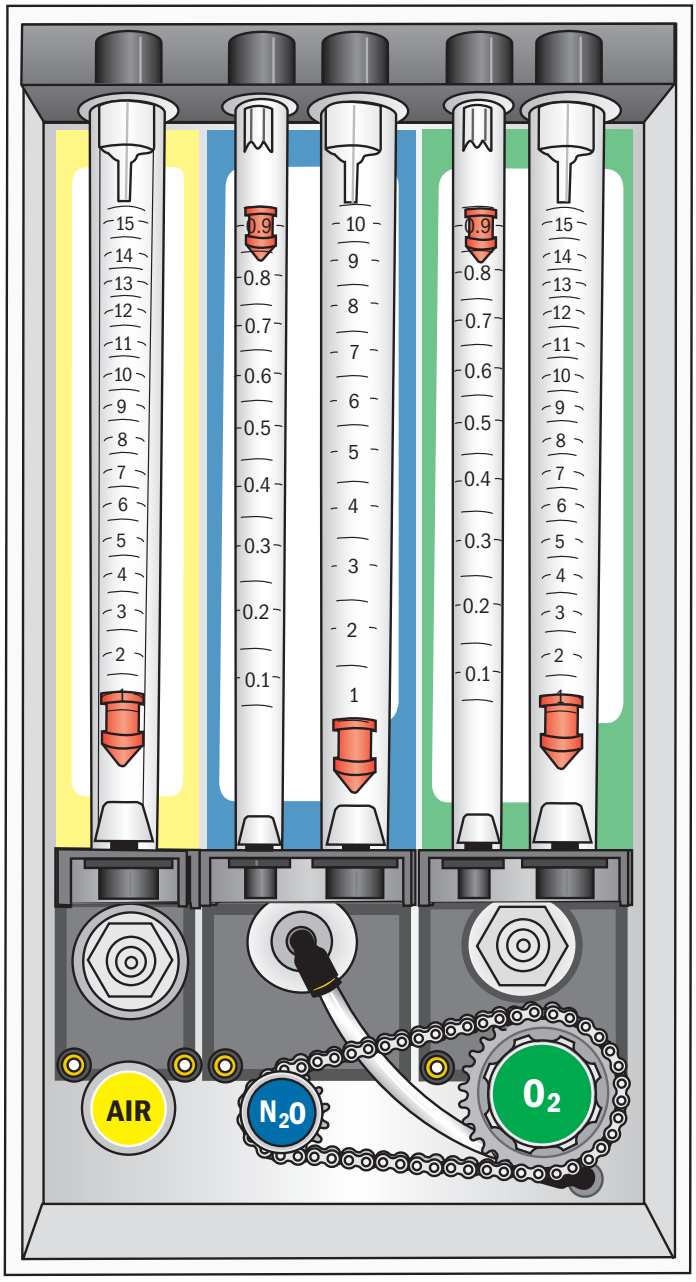


Figure 2.37 Flow Meters

Vaporizer Back Pressure Test

1. Set the System switch to ***On***. Alarms may occur.
2. Set the O_2 flow to ***6 l/min.***
3. Make sure that the O_2 flow stays constant and the float moves freely.
4. Adjust the vaporizer concentration from ***0*** to ***1%***. The O_2 flow must not decrease more than 1 l/min through the full range.

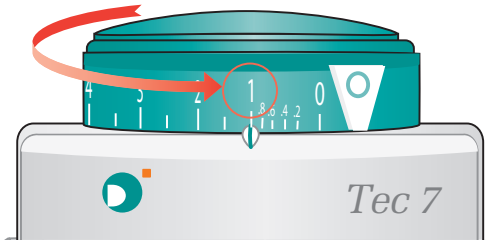


Figure 2.38 Adjust the vaporizer concentration

- If the O_2 flow decreases more than 1 l/min, install a different vaporizer and repeat the steps 1 through 4
- If the O_2 flow decreases less than 1 l/min when testing a different vaporizer, the malfunction is in the vaporizer that failed the test
- If the O_2 flow decreases more than 1 l/min with the different vaporizer, the malfunction is most likely in the system. Do not use the system

5. Repeat steps 1 through 4 for each vaporizer.

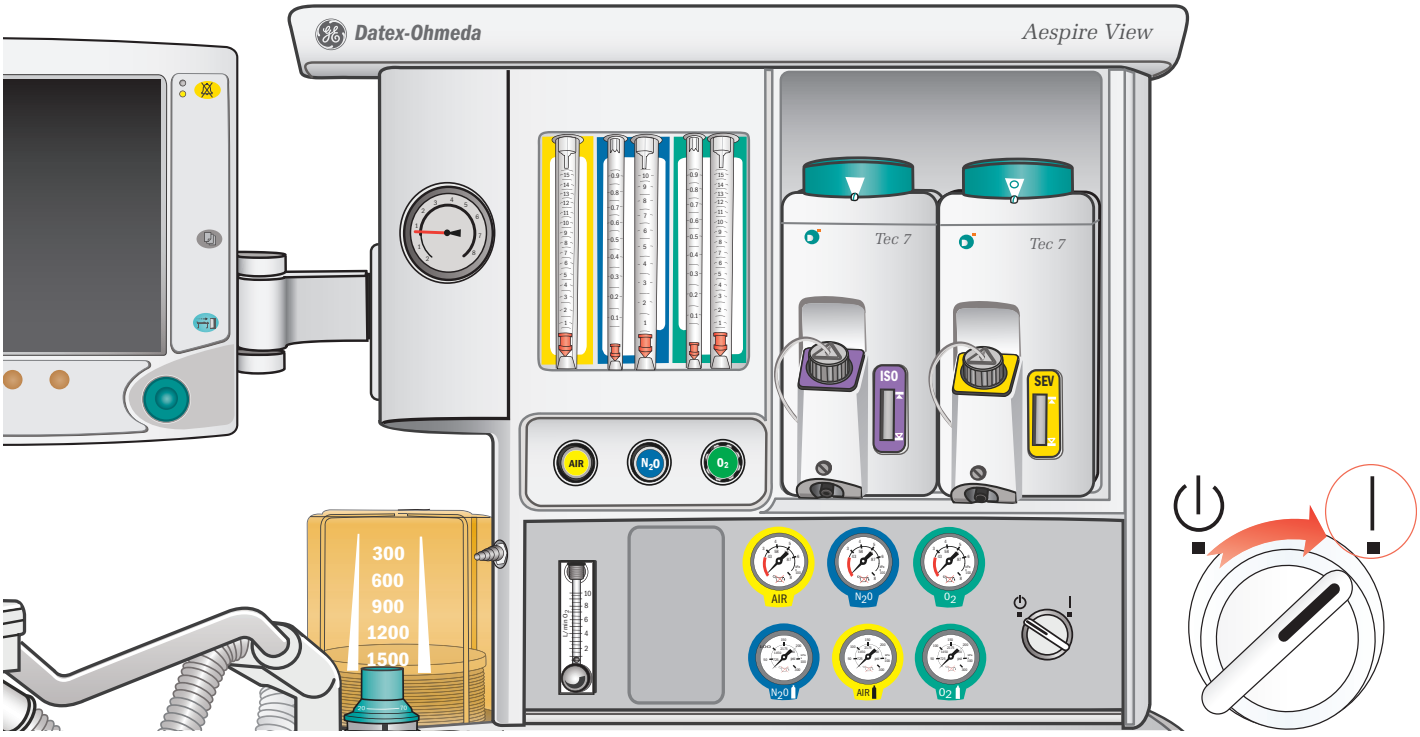
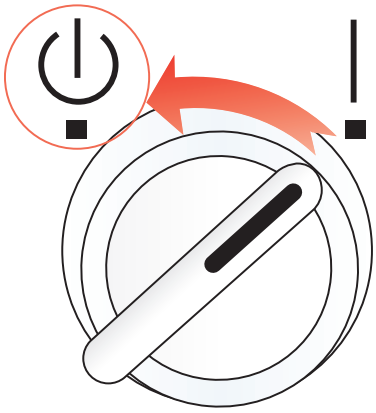


Figure 2.39 Set the vaporizers and flow meters

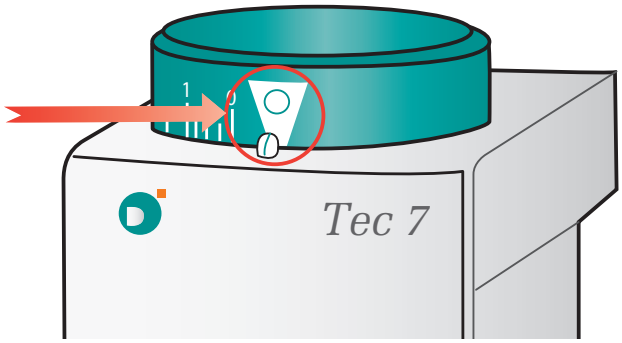
Negative Low-pressure Leak Test

Note! *Do not use a system that has a low-pressure leak. Anesthetic agent will go into the atmosphere instead of into the breathing circuit.*

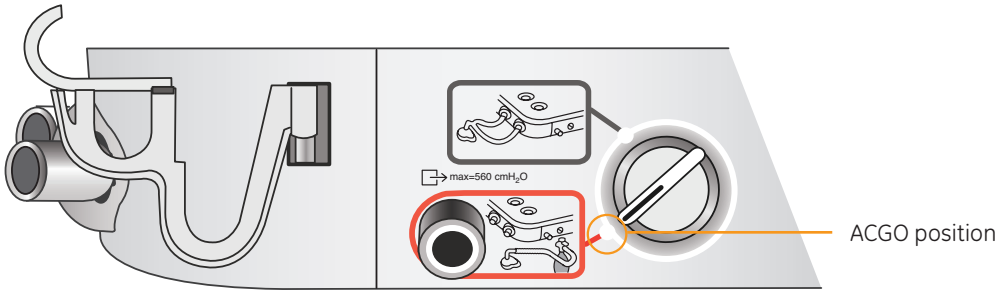
1. Make sure the System switch is set to ***Standby***.



2. Turn all the vaporizers ***off***.



3. Turn the ACGO switch to the ***ACGO position***.



4. Compress and release the bulb until all air is removed from the bulb.
   - Occlude the inlet of the test device. Make sure it is a tight seal
   - If the bulb of the test device inflates in less than 60 seconds, use a different test device

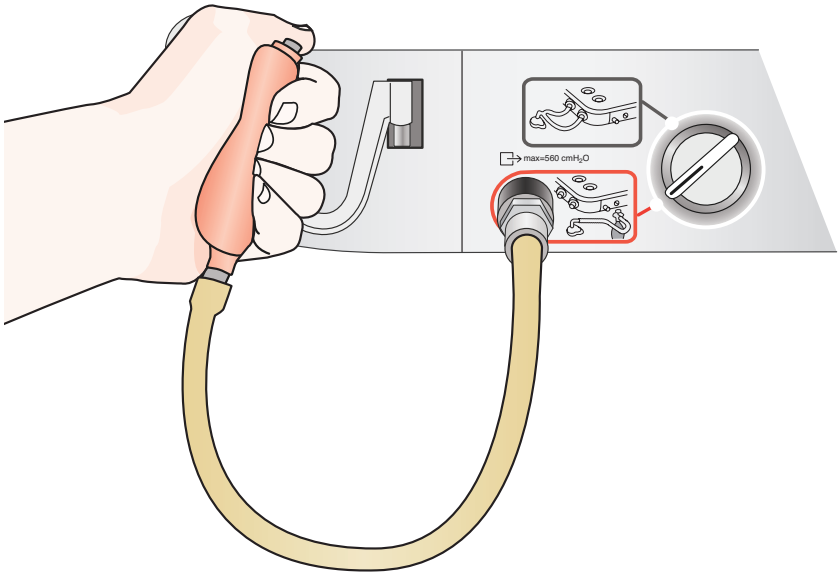
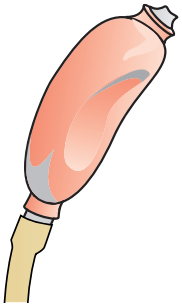


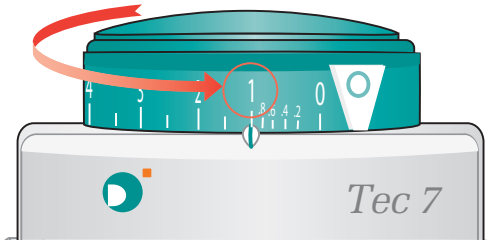
Figure 2.40 Compress and release bulb

5. Test the system for low-pressure leaks.
   - Turn the flow controls one and a half turns counterclockwise
   - Connect the test device to the auxiliary gas outlet
   - Compress and release the bulb until all air is removed from the bulb

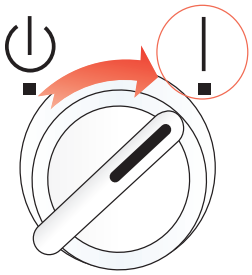


   - The floats will move. If the bulb inflates in 30 seconds or less, there is a leak in the low-pressure circuit. See ***Pneumatic problems*** in the ***Alarms and Troubleshooting*** section of the User's Reference Manual
   - Disconnect the test device

6. Test each vaporizer for low-pressure leaks.
   - Turn on one vaporizer
   - Set the vaporizer to ***1%***



   - Perform ***step 5***
   - Repeat this test with each vaporizer
   - If a low-pressure leak occurs while testing any of the vaporizers, see ***Pneumatic problems*** in the ***Alarms and Troubleshooting*** section of the User's Reference Manual
   - Turn the vaporizer ***off***
7. Turn all flow controls fully clockwise for minimum flow. Do not over tighten.
8. Clear the system of agent.
   - Set the System switch to ***On***



   - Set the O_2 flow to ***1 l/min***
   - Flow O_2 for one minute
   - Turn the O_2 flow control fully clockwise for minimum flow

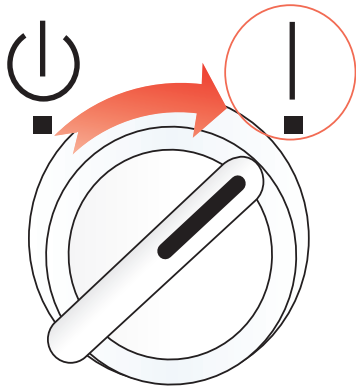
Note! *Agent mixtures from the low-pressure leak test stay in the system. Clear the system by flowing O2 at 1 l/min for one minute.*

9. Return the ACGO switch to the circle system position.

Alarm Tests

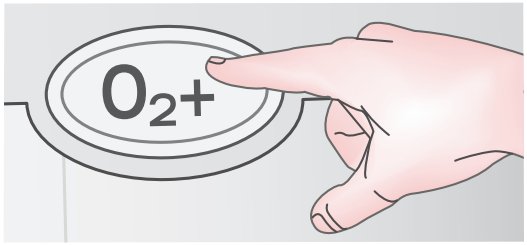
1. Connect a test lung to the patient connection.
2. Set the Bag/Vent switch to ***Vent.***

3. Set the System switch to ***On.***

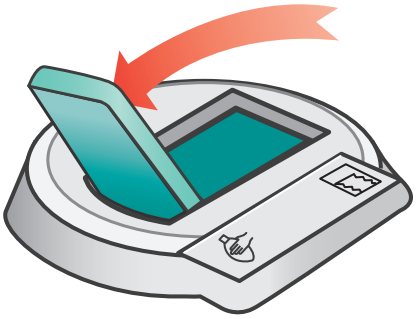


4. Push the ***Menu*** key.
5. Select ***Ventilation Mode*** > ***VCV.***
6. Set the ventilator parameters.
   - TV 400 ml.
   - Rate 12.
   - I:E 1:2.
   - Pmax 40 cmH_2O.
   - PEEP Off.
7. Set the O_2 flow to the minimum flow.
8. Turn off all other gases.

9. Push the ***O2 flush button*** to fill the bellows.

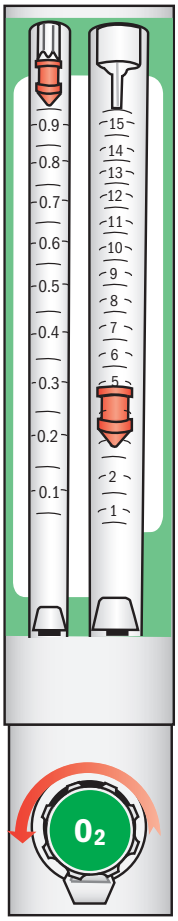


10. Set the Bag/Vent switch to ***Bag***, and then to ***Vent***. Make sure that:



- Mechanical ventilation starts.
- A subatmospheric pressure alarm does not occur.
- The ventilator shows the correct data based on settings.
- The bellows inflate and deflate during mechanical ventilation.

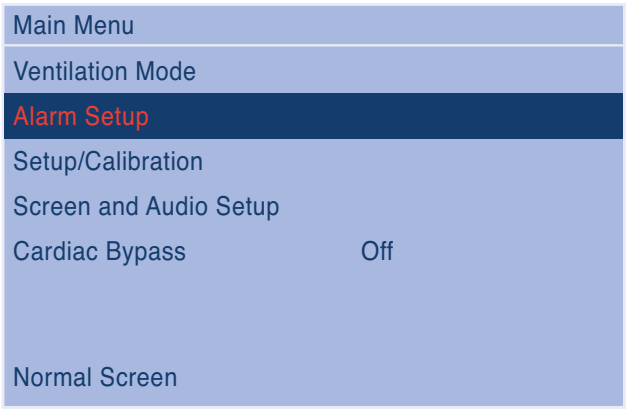
11. Set the O_2 flow control to ***5 l/min***. Make sure that:



- The pressure at the end of the breath is approximately 2 cmH_2O.
- The ventilator shows the correct data based on settings.
- The bellows inflate and deflate during mechanical ventilation.

Figure 2.42 Alarm Setup menu

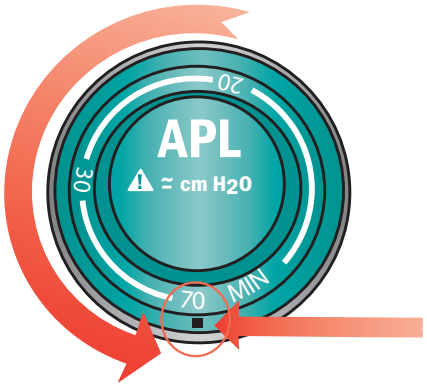
12. Test the O_2 monitor and alarms (alarms other than Low O_2 and High O_2 may occur).
    - Remove the ***O2*** cell, and make sure that the cell measures approximately ***21% O2*** in room air.
    - Push the ***Menu*** key.
    - Select ***Alarm Setup*** from the ***Main*** menu.



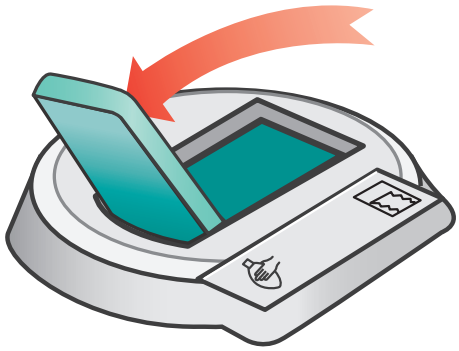
    - Set the Low O_2 alarm to ***50%,*** and make sure that a ***Low O2*** alarm occurs.
    - Set the Low O_2 alarm to 21%, and make sure that the ***Low O2*** alarm stops. This will create a latched alarm, acknowledge this by pushing the ***Alarm silence*** key.
    - Put the ***O2*** cell back into the circuit.
    - Set the High O_2 alarm to ***50%***.

- Push the ***O_2 flush button*** to fill the breathing system, and make sure that the ***High O_2 alarm*** occurs.
- Set the High O_2 alarm to ***Off,*** and make sure that the alarm stops.
- Flow 100% O_2 for 2 minutes, and make sure that the O_2 cell measures 100% O_2.

13. Test the low minute volume alarm.
    - Push the ***Menu*** key.
    - Select ***Alarm Setup*** from the Main Menu.
    - Set the alarm limit for low minute volume to 6 l/min.
    - Make sure that the low minute volume alarm occurs.
    - Set the low minute volume alarm to ***Off.***
14. Test the low airway pressure alarm.
15. Remove the test lung from the patient connection.
16. Make sure that the low airway pressure alarm occurs (other alarms may occur).
17. Test the sustained airway pressure alarm.
18. Set the APL valve to ***70 cmH_2O***.



19. Set the Bag/Vent switch to ***Bag.***



20. Occlude the patient connection and push the ***O_2 flush button.***
21. Make sure that the Ppeak high. Blockage? (sustained airway pressure) alarm occurs after approximately 15 seconds at the sustained pressure limit.

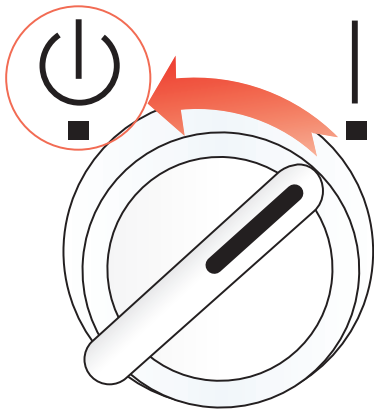
Breathing System Tests

1. Make sure that the auxiliary equipment is functioning correctly.
2. Verify that AGSS is functioning correctly.
   - Some breathing systems with active AGSS have a flow indicator on the side. Make sure that the flow indicator shows a flow in the green range
3. Make sure that the check valves on the breathing circuit module work correctly.
   - The expiratory check valve rises during expiration and falls at the start of inspiration
   - The inspiratory check valve rises during inspiration and falls at the start of expiration

Note! *After performing the breathing system tests, make sure that there are no test plugs or other objects caught in the breathing system.*

Breathing System Bellows Test

1. Set the System switch to ***Standby.***



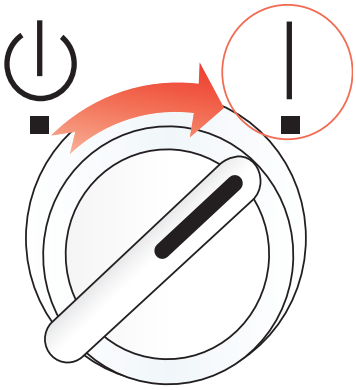
2. Set the Bag/Vent switch to ***Vent.***

3. Set all flow controls to ***minimum flow.***
4. Occlude the patient connection.

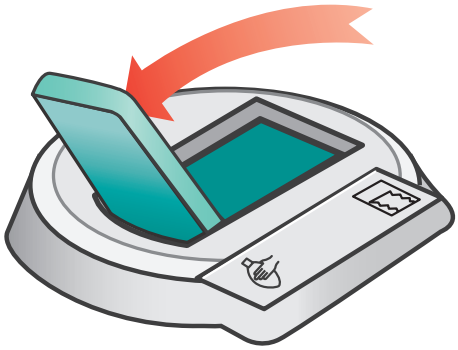
5. Push the ***O_2 flush button*** to fill the bellows. Release the ***O2 flush button***.
6. Make sure that the pressure does not increase to more than 15 cmH_2O on the pressure gauge.
7. If the bellows falls lower than the top of the indicator, there is a leak. See ***Breathing system problems*** in the ***Alarms and Troubleshooting*** section of the User's Reference Manual.

Breathing System Circuit Test

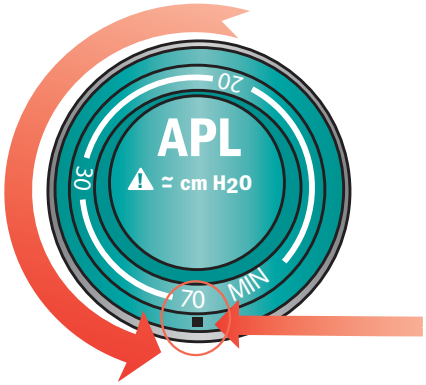
1. Set the System switch to ***On***.



2. Set the Bag/Vent switch to ***Bag***.



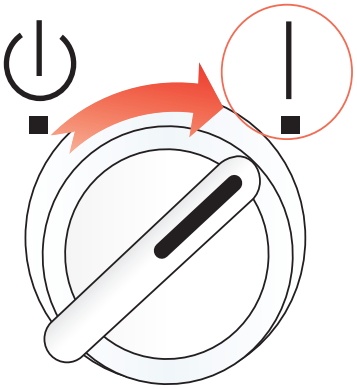
3. Occlude the bag port.
4. Set the APL valve to ***70 cmH_2O***.



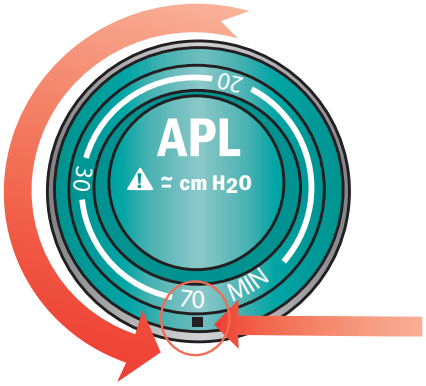
5. Set the O_2 flow to ***250 ml/min.***
6. Occlude the patient connection.
7. Push the ***O2 Flush button*** and pressurize the bag to approximately ***30 cmH_2O.***
8. Release the ***O2 flush button***. The pressure must not decrease. Any pressure decrease shown on the pressure gauge indicates a leak. Repair any leaks in the breathing circuit. See ***Breathing system problems*** in the ***Alarms and Troubleshooting*** section of the User's Reference Manual.

Breathing System APL Valve Test

1. Set the System switch to ***On.***



2. Occlude the patient connection.
3. Occlude the bag port.
4. Set the APL valve to ***70 cmH_2O.***



5. Set the O_2 flow to ***3 l/min.*** Make sure that the value on the inspiratory pressure gauge does not exceed ***85 cmH_2O***. Some pressure fluctuation is normal.
6. Set the APL valve to ***MIN.***
7. Make sure that the value on the inspiratory pressure gauge is less than approximately ***5 cmH_2O.***
8. Push the ***O_2 flush button***. Make sure that the value on the inspiratory pressure gauge stays near zero.
9. Set the O_2 flow to minimum and make sure that the value on the inspiratory pressure gauge does not decrease below ***0 cmH_2O.***

Ventilation

7900 Ventilator

The 7900 ventilator uses a microprocessor-controlled ventilator with internal monitors, electronic PEEP, Volume Mode and other optional features. The ventilator uses flow sensors to adjust its output for changes in fresh gas flow, small leaks, and gas compression upstream of the breathing circuit. There is adjustment for compression in the patient circuit. The Advanced Breathing System (ABS) has a small circuit volume, optimized for low and minimal flow applications.

Modes

In addition to Volume Control Ventilation (VCV), the Aespire View can provide Pressure Control Ventilation (PCV), Synchronized Intermittent Mandatory Ventilation (SIMV) with pressure support, Pressure Support Ventilation with Apnea protection backup mode (PSVPro), SIMV with Pressure Control, and Pressure Control Ventilation with Volume Guarantee (PCV-VG).

VCV:	Volume Control Ventilation (20-1500 ml)
PCV:	Pressure Control Ventilation (5-60 cmH_2O)
SIMV/PSV:	Synchronized Intermittent Mandatory Ventilation (SIMV) with Pressure Support Ventilation (PSV)
PSVPro:	Pressure Support Ventilation with Apnea Backup
SIMV–PC:	Synchronized Intermittent Mandatory Ventilation with Pressure Control
PCV-VG:	Pressure Control Ventilation with Volume Guarantee

Each of these modes will be described in greater detail on the following pages.

Volume Controlled Ventilation (VCV)

Volume control supplies a set tidal volume. The ventilator calculates a flow based on the set tidal volume and the length of the inspiratory time from the I:E and respiratory rate settings. An optional inspiratory pause can be set to improve gas distribution in the lungs.

A typical volume-controlled pressure waveform increases throughout the entire inspiratory period and rapidly decreases at the start of expiration.

The ventilator adjusts gas flow to the bellows based on measured inspiratory volumes. This is called tidal volume compensation.

Volume control settings include:

- **TV:** sets the amount of tidal volume
- **RR:** sets the rate of mechanically driven breaths
- **I:E:** sets the amount of inspiration to expiration ratio
- **Pmax:** sets the maximum airway pressure
- **Tpause:** sets the inspiratory pause time

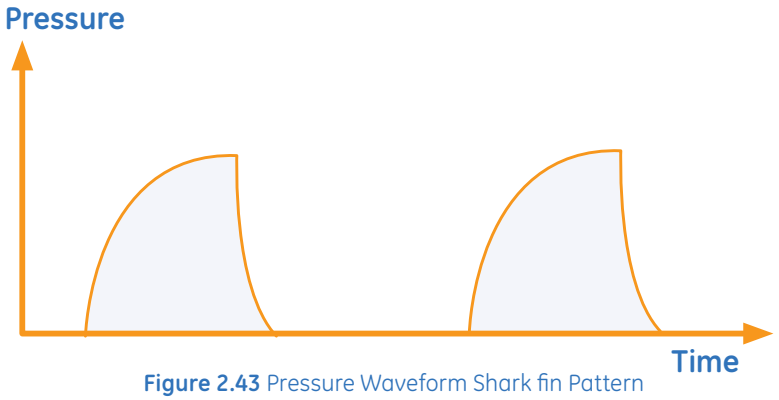


Figure 2.43 Pressure Waveform Shark fin Pattern

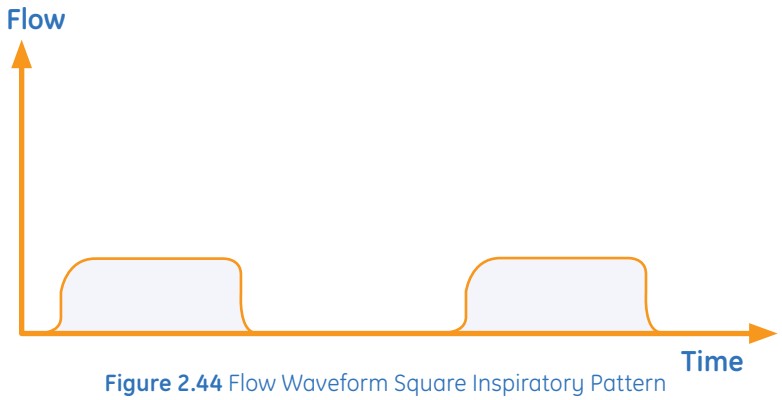


Figure 2.44 Flow Waveform Square Inspiratory Pattern

Pressure Controlled Ventilation (PCV)

Pressure control supplies a constant set pressure during inspiration. The ventilator calculates the inspiratory time from the respiratory rate and I:E ratio settings. A high initial flow pressurizes the circuit to the set inspiratory pressure. The flow then decreases to maintain the set pressure (Pinsp).

Pressure sensors in the ventilator measure patient airway pressure. The ventilator automatically adjusts the flow to maintain the set inspiratory pressure.

Pressure control settings include:

- **Pinsp:** sets the target airway pressure.
- **RR:** sets the rate of mechanically driven breaths.
- **I:E:** sets the amount of inspiration to expiration ratio.
- **Pmax:** sets the maximum airway pressure.
- **PEEP:** sets the positive end expiratory pressure.
- **Rise Rate:** sets the amount of time to attain Pinsp.

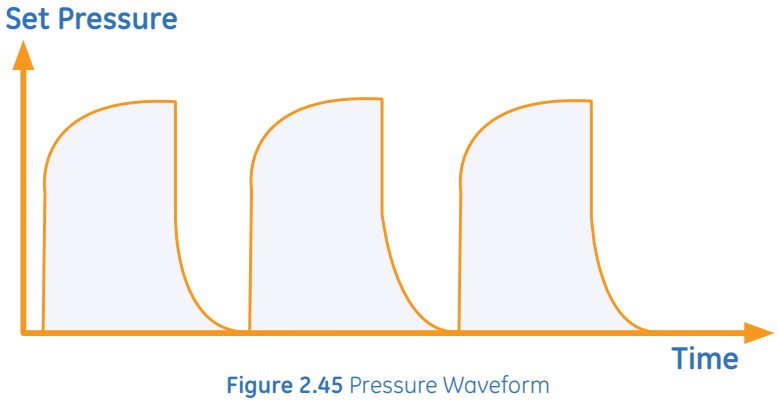


Figure 2.45 Pressure Waveform

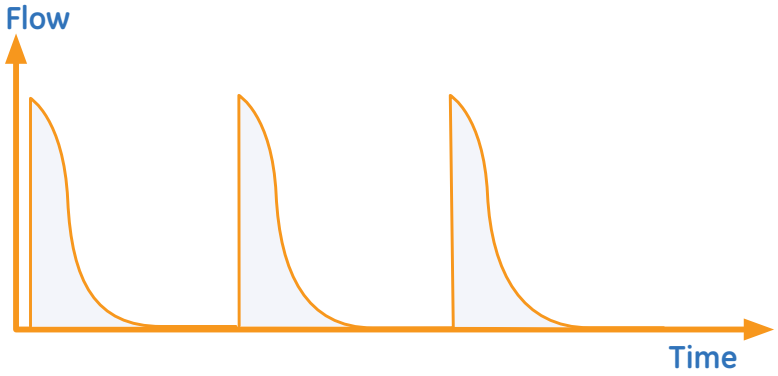


Figure 2.46 Flow Waveform

SIMV/PSV

Synchronized Intermittent Mandatory Ventilation with Pressure Support (SIMV/PSV) is a mode in which periodic volume breaths are delivered to the patient at preset intervals (time-triggered). Between the machine delivered breaths, the patient can breathe spontaneously at the rate, tidal volume, and timing that the patient desires.

At the specified time interval, the ventilator will wait for the next inspiratory effort from the patient. The sensitivity of this effort is adjusted using the flow trigger level. When the ventilator senses the beginning of inspiration it synchronously delivers a volume breath using the set tidal volume, and inspiratory time that is set on the ventilator. If the patient fails to make an inspiratory effort during the trigger window time interval, the ventilator will deliver a machine breath to the patient. The ventilator will always deliver the specific number of breaths per minute that the clinician has set.

In SIMV/PSV, the spontaneous breaths can be pressure supported to assist the patient in overcoming the resistance of the patient circuit and the artificial airway. When the Psupport level is set, the ventilator will deliver the pressure support level to the patient during inspiration. PEEP can also be used in combination with this mode.

SIMV/PSV settings include:

- **TV:** sets the amount of tidal volume.
- **RR:** sets the rate of mechanically driven breaths.
- **Tinsp:** sets the inspiration time for a mechanical breath.
- **Psupport:** sets the pressure support level.
- **PEEP:** sets the positive end expiratory pressure.
- **Pmax:** sets the maximum airway pressure.
- **Rise Rate:** sets the amount of time to attain Pinsp.
- **Tpause:** sets the inspiratory pause time.
- **End of Breath:** the drop in inspiratory flow from the peak inspiratory flow level where the ventilator stops delivering pressure support and begins exhalation.
- **Trigger:** sets the flow trigger level.
- **Trig Window:** sets the range in percent of the exhalation phase where a patient may trigger a mechanical breath.

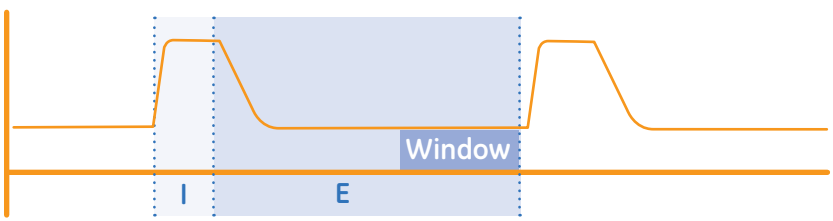


Figure 2.47 Example of Trigger Window

PSVPro

PSVPro is pressure supported ventilation with apnea backup. PSVPro is a spontaneous mode of ventilation that provides a constant pressure once the ventilator senses that the patient has made an inspiratory effort. In this mode, the clinician sets the Pressure Support (Psupport) and PEEP levels. The patient establishes the rate, inspiratory flow, and inspiratory time. The tidal volume is determined by the pressure, lung characteristics, and patient effort.

PSVPro uses an inspiration termination level that establishes when the ventilator will stop the pressure supported breath and cycle to the expiratory phase. The inspiration termination level is user adjustable from 5% to 50%. This parameter sets the percent of the peak inspiratory flow that the ventilator uses to end the inspiratory phase of the breath and to cycle into the expiratory phase. If the inspiration termination is set to 30% then the ventilator will stop inspiration when the flow decelerates to a level equal to 30% of the measured peak inspiratory flow. The lower the setting the longer the inspiratory time and conversely, the higher the setting the shorter the inspiratory phase.

An apnea backup mode is provided in the event the patient stops breathing. When setting this mode the clinician adjusts the inspiratory pressure (Pinsp), respiratory rate, and the inspiratory time (Tinsp). As long as the patient is triggering the ventilator and the apnea alarm does not activate, the patient will get pressure-supported breaths and the ventilator will not deliver machine breaths.

If the patient stops triggering the ventilator for the set apnea delay time, the apnea alarm will activate and the ventilator will automatically switch to the backup mode that is SIMV-PC mode. See “SIMV-PC” for operation details for this mode.

When the ventilator switches to the backup mode, the alarm text Backup Mode active displays and remains in the low priority message site until PSVPro is reinstated or until another mode is selected. To reactivate the PSVPro mode the user must go into the Ventilation Mode menu and select PSVPro. Upon selecting PSVPro the ventilator will immediately begin providing pressure supported breaths to the patient using the established settings.

PSVPro settings include:

- **Pinsp:** sets the target airway pressure.
- **RR:** sets the rate of mechanically driven breaths.
- **Tinsp:** sets the inspiration time for a mechanical breath.
- **Psupport:** sets the pressure support level.
- **Pmax:** sets the maximum airway pressure.
- **PEEP:** sets the positive end expiratory pressure.
- **Rise Rate:** sets the amount of time to attain Pinsp.
- **End of Breath:** the drop in inspiratory flow from the peak inspiratory flow level where the ventilator stops pressure support mechanical inspiration and begins exhalation.
- **Trigger:** sets the flow trigger level.
- **Trig Window:** sets the range in percent of the exhalation phase where a patient may trigger a mechanical breath.
- **Backup mode active:** sets the time for backup mode to activate.

SIMV-PC

Synchronized Intermittent Mandatory Ventilation with Pressure Controlled Ventilation is a mode in which a relatively slow mandatory breathing rate is set with pressure-controlled breathing. This mode combines mandatory breaths with spontaneous breath support. If a trigger event occurs within the synchronization window, a new pressure-controlled breath is initiated. If a trigger event occurs elsewhere during the expiratory phase, a support for a spontaneous breath is provided with pressure support added as set by the clinician.

SIMV-PC settings include:

- **Pinsp:** sets the target airway pressure.
- **RR:** sets the rate of mechanically driven breaths.
- **Tinsp:** sets the inspiration time for a mechanical breath.
- **Psupport:** sets the pressure support level.
- **Pmax:** sets the maximum airway pressure.
- **PEEP:** sets the positive end expiratory pressure.
- **Rise Rate:** sets the amount of time to attain Pinsp.
- **End of Breath:** the drop in inspiratory flow from the peak inspiratory flow level where the ventilator stops pressure support mechanical inspiration and begins exhalation.
- **Trigger:** sets the flow trigger level.
- **Trig Window:** sets the range in percent of the exhalation phase where a patient may trigger a mechanical breath.

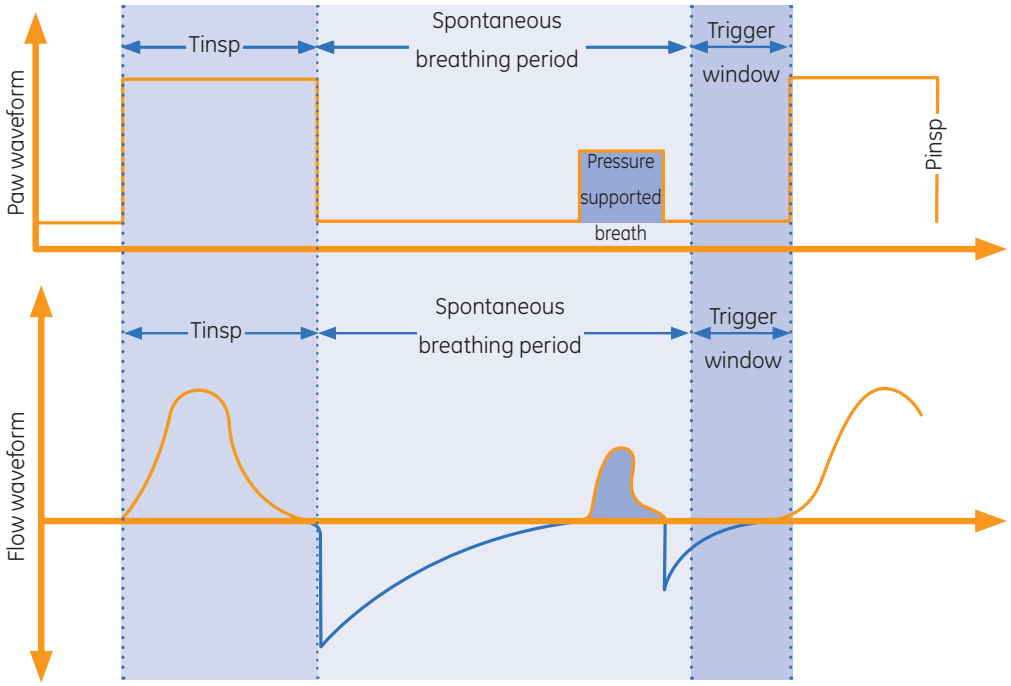


Figure 2.48 Example of Pressure and Flow Waveforms

PCV-VG

In PCV-VG, a tidal volume is set and the ventilator delivers that volume using a decelerating flow and a constant pressure. The ventilator will adjust the inspiratory pressure needed to deliver the set tidal volume breath-by-breath so that the lowest pressure is used. The pressure range that the ventilator will use is between the PEEP+2 cmH_2O level on the low end and 5 cmH_2O below Pmax on the high end. The inspiratory pressure change between breaths is a maximum of ±3 cmH_2O.

This mode will deliver breaths with the efficiency of pressure controlled ventilation, yet still compensate for changes in the patient's lung characteristics. PCV-VG begins by first delivering a volume breath at the set tidal volume. The patient's compliance is determined from this volume breath and the inspiratory pressure level is then established for the next PCV-VG breath.

PCV-VG settings include:

- **Pinsp:** sets the target airway pressure.
- **RR:** sets the rate of mechanically driven breaths.
- **I:E:** sets the amount of inspiration to expiration ratio.
- **PEEP:** sets the positive end expiratory pressure.
- **Pmax:** sets the maximum airway pressure.
- **Rise Rate:** sets the amount of time to attain Pinsp.

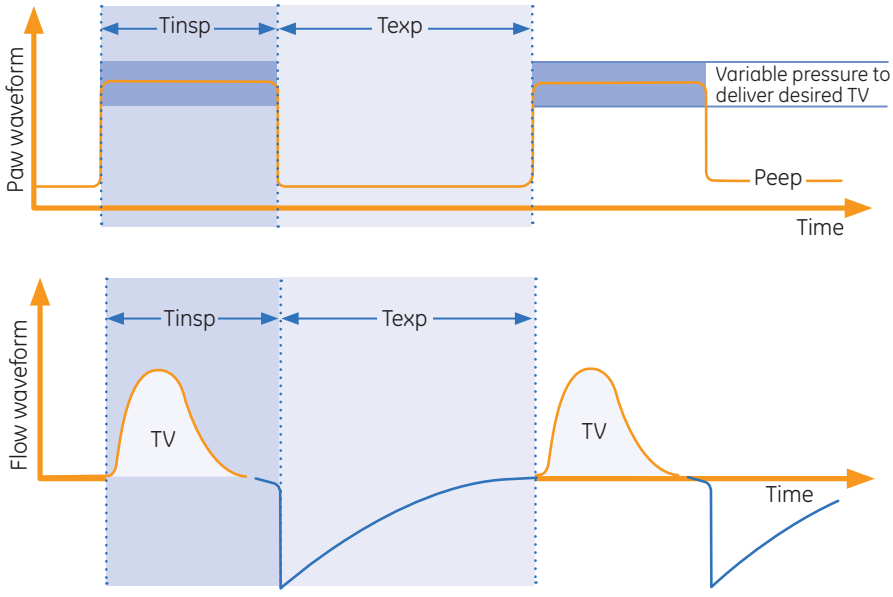


Figure 2.49 Example of PCV-VG Waveforms

Ventilator Main Menu

Ventilation Mode

Figure 2.50 Main menu - ventilation mode

1. Push the ***Menu*** key.
2. Select ***Ventilation Mode*** from the Main menu.
3. Use the ComWheel to highlight the desired setting (PSVPro shown), and push the ComWheel to confirm the change.
4. Set the values for the selected ventilation mode.
   - The value is highlighted while being set.
5. Push the ***ComWheel*** or the ***quick key*** to activate the change.
   - The system returns to the normal monitoring screen.
   - The ventilation mode shows on the screen.

Alarm Setup

Use the volume alarms key to turn the volume alarms on and off. When the alarms are off, an X covers the alarm limits. Use this control during manual ventilation when constant attention is on the patient.

Use the End case key to minimize alarms between cases. The alarms will reactivate when two or more breaths are detected within 30 seconds.

Note! *Do not turn off volume alarms for a spontaneously breathing patient. The system will not alarm for low volume.*

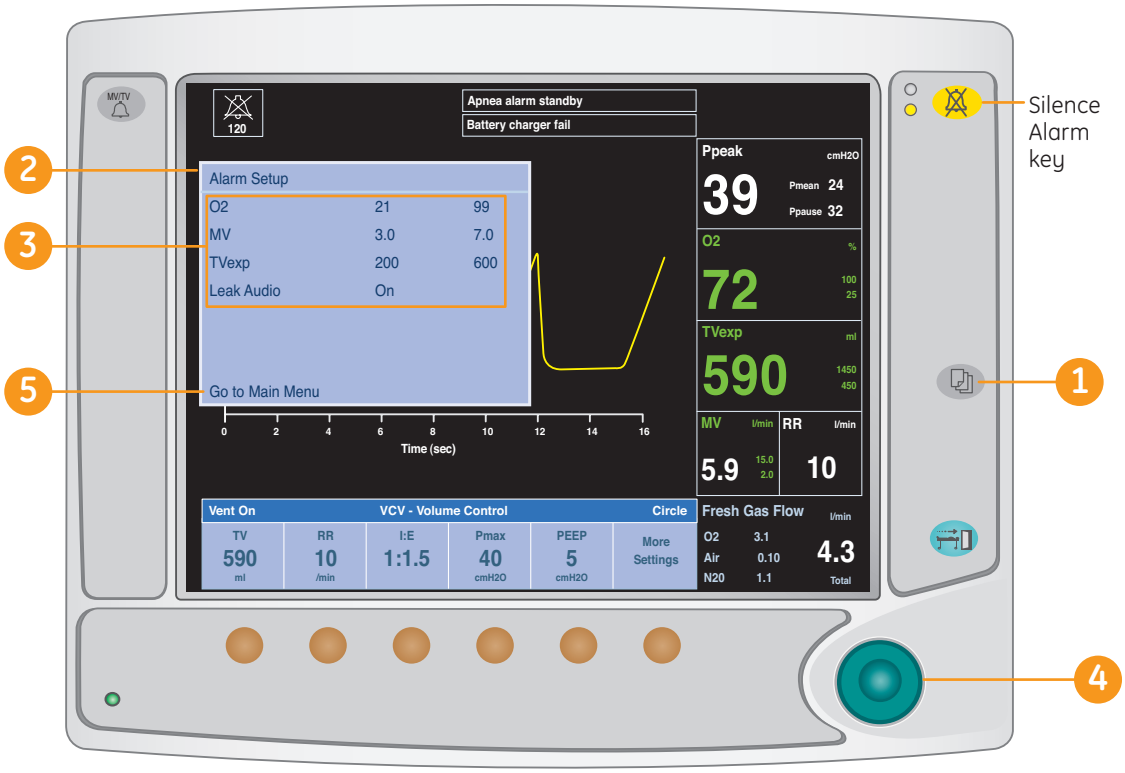


Figure 2.51 Alarm Setup menu

To set or change alarm limits:

1. Push the ***Menu*** key.
2. Select ***Alarm Setup*** from the Main Menu.
3. To set an alarm limit, use the ComWheel to scroll to the desired alarm limit. Push the ***ComWheel*** to select the limit. The following alarm limits can be set or changed:
   - **O2, MV, and TVexp:** Alarm limits for both high and low can be set. The low limit is the left numeric field, and the high limit is the right numeric field.
   - **Leak Audio:** The patient circuit leak alarm activates during mechanical ventilation if less than half of the inspired volume returns through the expiratory flow sensor. Prevent expected alarms from known circuit leaks by setting the Leak Audio to ***Off.***
4. Change the value with the ComWheel.
5. Select ***Go to Main Menu*** to return to the Main Menu, or push the ***Menu*** key to return to the normal monitoring screen.

Setup/Calibration

1. Push the ***Menu*** key.
2. Select ***Setup/Calibration*** from the Main Menu. The following window will appear:

Figure 2.52 Setup/Calibration menu

3. Use the ComWheel to scroll to the desired submenu. Push the ***ComWheel*** to confirm the selection. Select ***More Vent Settings*** to set the following ventilator values:
   - Pmax
   - Trig Window
   - Trigger
   - End of Breath
   - Backup Mode Active
   - Tpause
   - Rise Rate
4. After selecting a ventilator setting, set it to the desired value by turning the ComWheel. Confirm the value is correct by pushing the ***ComWheel***.
5. Select ***Go to Setup/Calibration Menu*** to return to the Setup/Calibration, or push the ***Menu*** key to return to the normal monitoring screen.

Cardiac Bypass

Cardiac Bypass suspends alarms for patients on cardiac bypass when the ventilator is not mechanically ventilating. Mechanical ventilation must be off. When mechanical ventilation is turned on, Cardiac Bypass is automatically turned off, the alarms are enabled, and monitoring is available.

Note! *Cardiac Bypass mode should only be used when the patient is receiving extra-corporeal oxygenation by means of a heart-lung machine. This mode of ventilation is not intended to provide metabolic levels of ventilation to the patient.*

Figure 2.53 Main Menu - Cardiac Bypass

1. Set the Bag/Vent switch to ***Bag.***
2. Push the ***Menu*** key.
3. Select ***Cardiac Bypass.***
4. Set Cardiac Bypass to ***On.***
5. Push the ***ComWheel*** to activate the change.
   - The screens shows Cardiac bypass and Apnea alarm off in the alarm area
6. Select ***Go to Main Menu*** to return to the Main Menu, or push the ***Menu*** key to return to the normal monitoring screen.

Assembly and Cleaning

Advanced Breathing System (ABS)

Assemble and disassemble the breathing system including the flow sensor module, breathing circuit module, bellows assembly, and exhalation valve assembly after removing the breathing system using the steps bellow.

1. Disconnect the bag hose from the bag hose connector.
2. Hold the Medisorb Canister by the handle and push on the release latch to unlock the canister. Tilt the canister downward to remove it off of the two support pins. For EZchange canisters, slide the canister up and out of the cradle.
3. Push the release button and gently pull the latch handle toward you to release the system.
4. Grasp the rear handle to support the breathing system. Slide the breathing system away from the workstation by pulling it toward you using the latch handle.

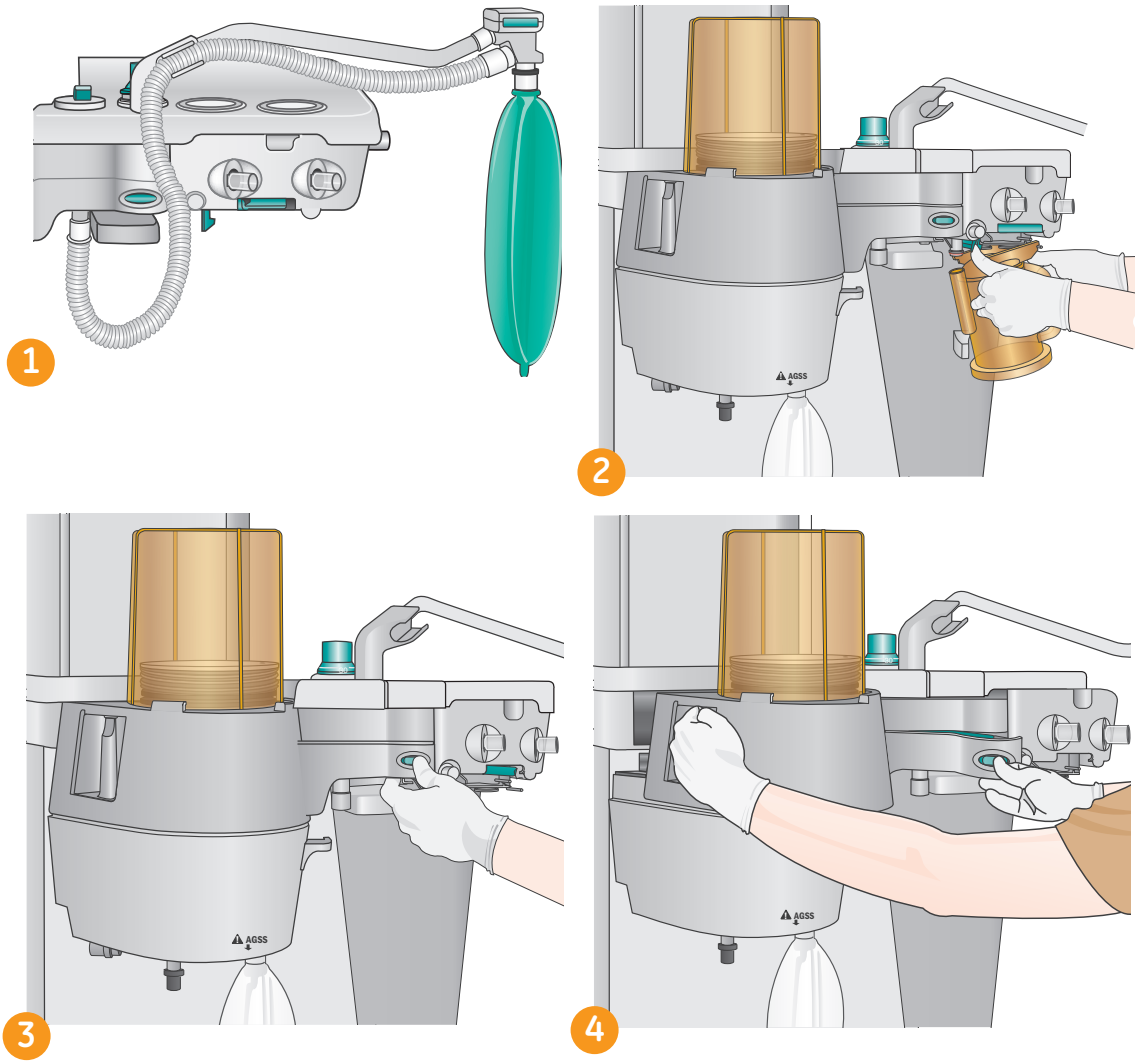


Figure 2.54 Removing the Breathing System

Replace the Breathing System:

1. Align the pin openings with the guide pins.
2. Hold the rear handle and the latch handle and slide the breathing system onto the guide pins.
3. Use the grip under the latch handle to push the breathing system in fully until it latches firmly.
4. Install the absorber canister and bag hose.
5. Complete a full machine check to ensure that the breathing system is properly assembled.

Note! *Please refer to the* ***Advanced Breathing System Cleaning and Sterilization User's Reference Manual*** *for more information on cleaning and sterilization. Any part labeled with 134 degree Celsius can be autoclaved.*

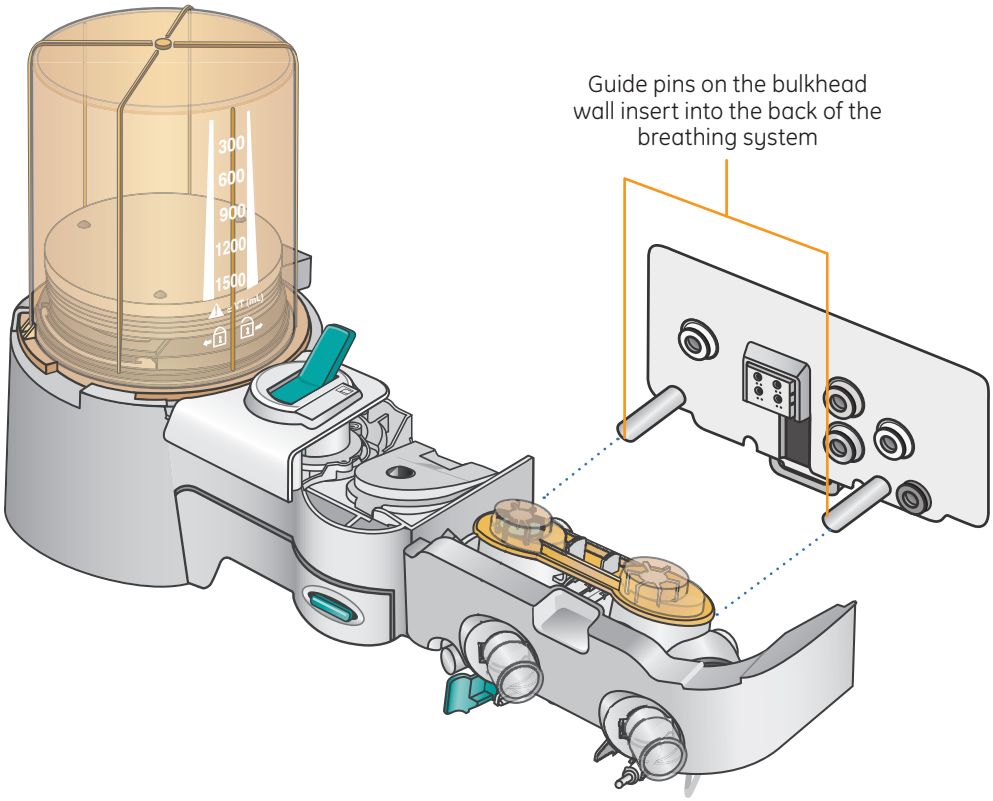


Figure 2.55 Replacing the Breathing System

Flow Sensor Module

Remove the Flow Sensor Module:

1. Pull the latch to unlock the flow sensor module. Pull the flow sensor module from the breathing system.

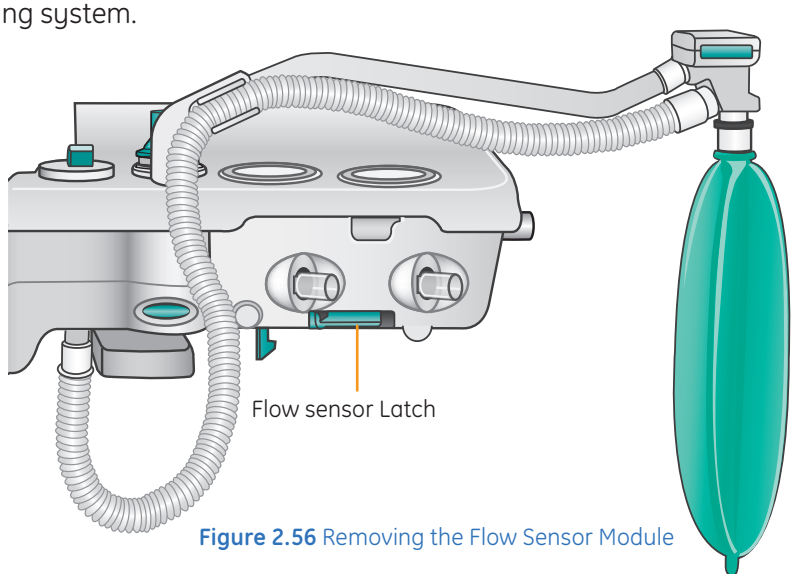


Figure 2.56 Removing the Flow Sensor Module

Remove the Flow Sensors:

1. Loosen the thumbscrew.
2. Pull off the flow sensor cover from the flow sensor holder.
3. Remove the flow sensor connectors from the flow sensor holder.
4. Pull the flow sensors from the flow sensor holder.
5. Plastic flow sensors cannot be autoclaved and should last a minimum of six months. Metal flow sensors can be autoclaved and should last a minimum of one year. Replace flow sensors as necessary.

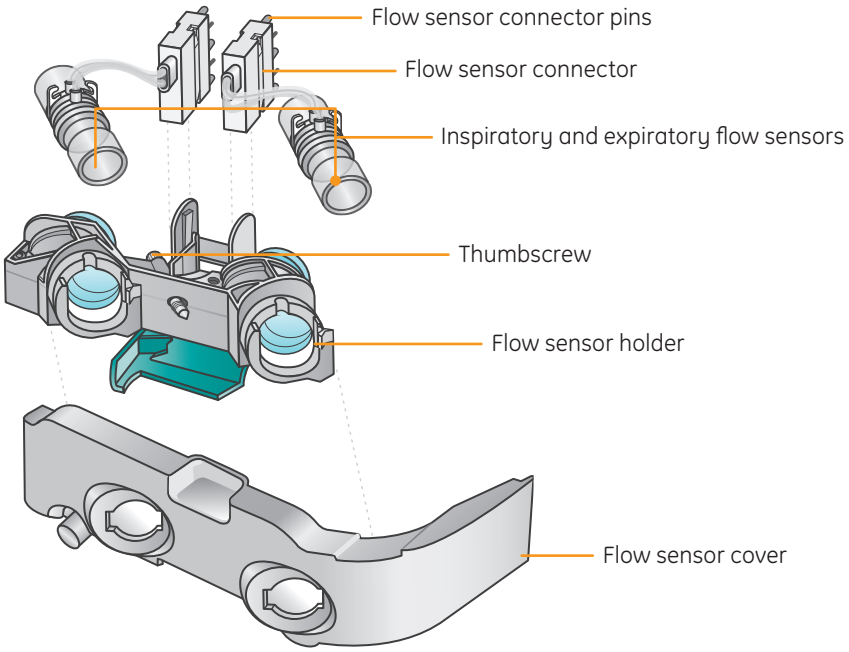


Figure 2.57 Flow Sensor Components

Replace the Flow sensors:

1. Insert the flow sensors into the flow sensor holder.
2. Attach the flow sensor connectors to the flow sensor holder.
3. Attach the cover to the flow sensor holder.
4. Tighten the thumbscrew to fasten the cover.

Replace the Flow Sensor Module:

1. Attach the flow sensor module to the breathing system. Be sure to align the flow sensor tubes with the grooves in the flow sensor holder.
2. Push the latch closed to lock the flow sensor module into place on the breathing system.

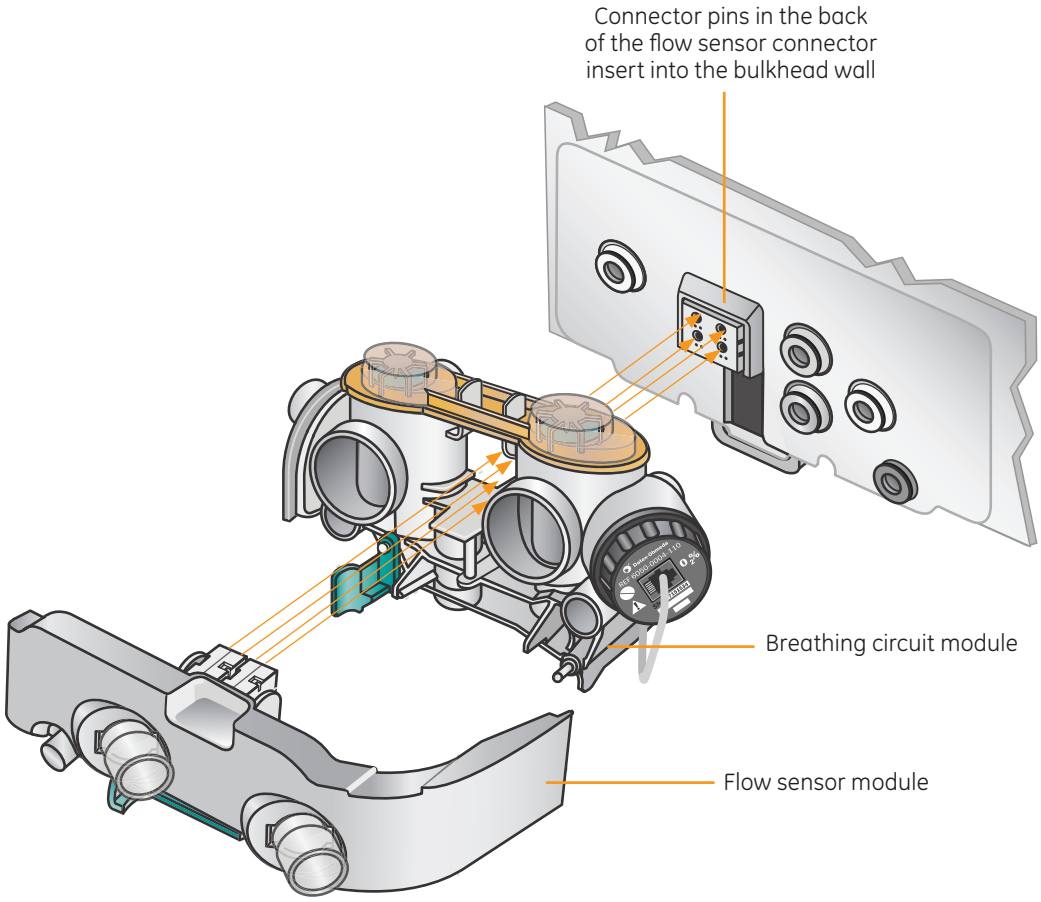


Figure 2.58 Replacing the Flow Sensors

Breathing Circuit Module

Remove the Breathing Circuit Module:

1. If applicable - Remove the O_2 cell cable from the cell. Unscrew the O_2 cell counterclockwise and remove it. Remove the O_2 cell cable by pressing on the connector button while pulling the connector out.
2. Rotate the breathing circuit module counterclockwise. After rotating, pull the breathing circuit module apart from the bellows assembly by lifting up on the breathing circuit module.
3. On the breathing circuit module, remove the check valve lens by squeezing the latches together and pulling up on the lens. Lift out the check valve assemblies.

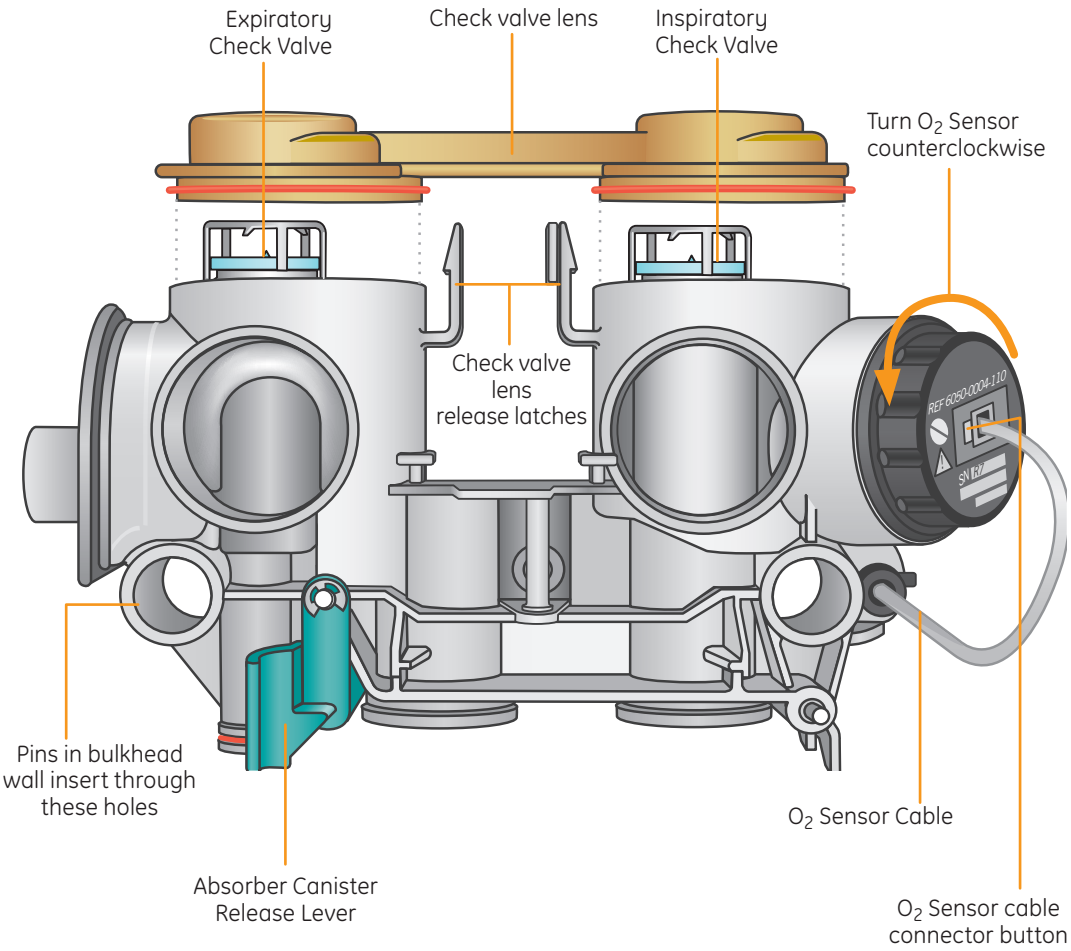
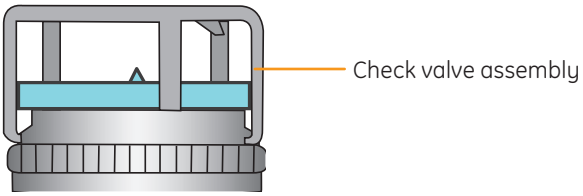


Figure 2.59 Removing the Breathing Circuit Module

Replace the Breathing Circuit Module:

1. On the breathing circuit module, replace the check valve assemblies. Push the check valve circuit lens down onto the latches to lock the lens in place.



2. Insert the breathing circuit module into the bellows assembly aligned as shown.
3. Rotate the breathing circuit module clockwise at the point shown by the dotted line to attach it to the bellows assembly.
4. If applicable – Replace the cell by screwing it in clockwise. Reconnect the O_2 cell cable.

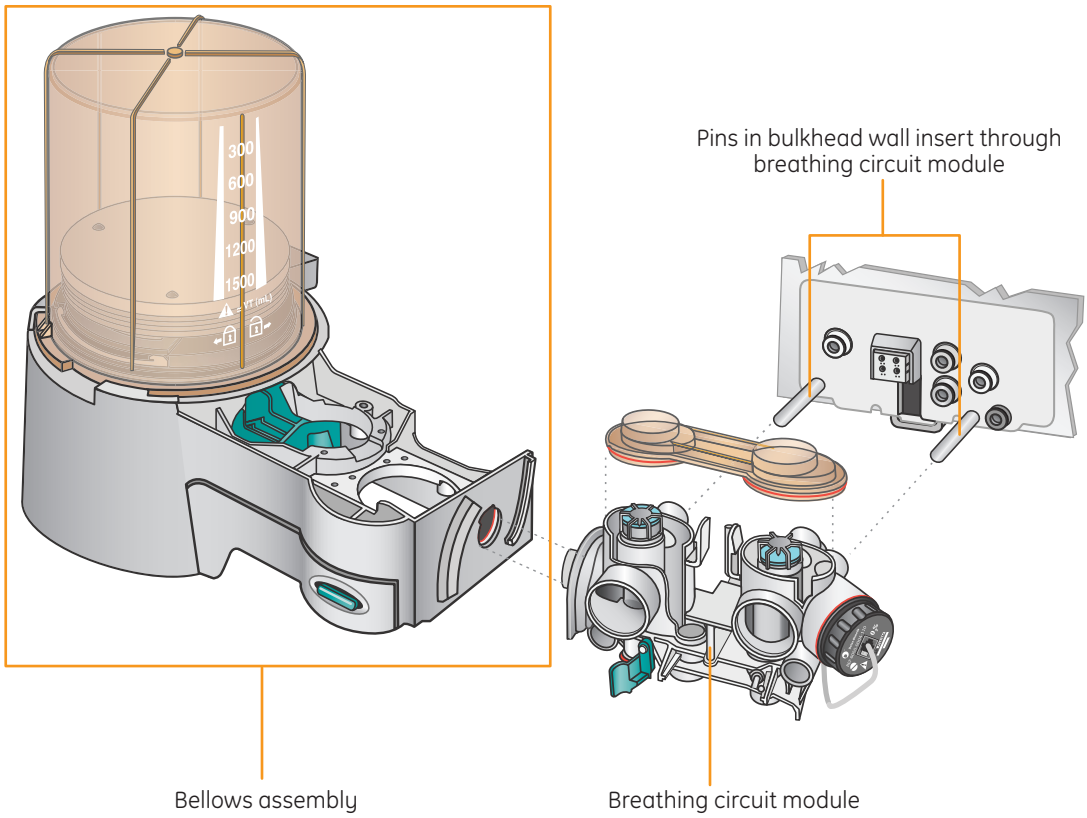


Figure 2.60 Replacing the Breathing Circuit

Bellows Assembly

Disassemble the bellows assembly:

1. Turn the bellows housing counterclockwise and lift.
2. Remove the bottom edge of the bellows and lift.
3. Push the two tabs toward the center and remove the rim.
4. Remove the pressure relief valve.
5. Push the latch toward the center and remove the locking tabs.
6. Remove the seal.

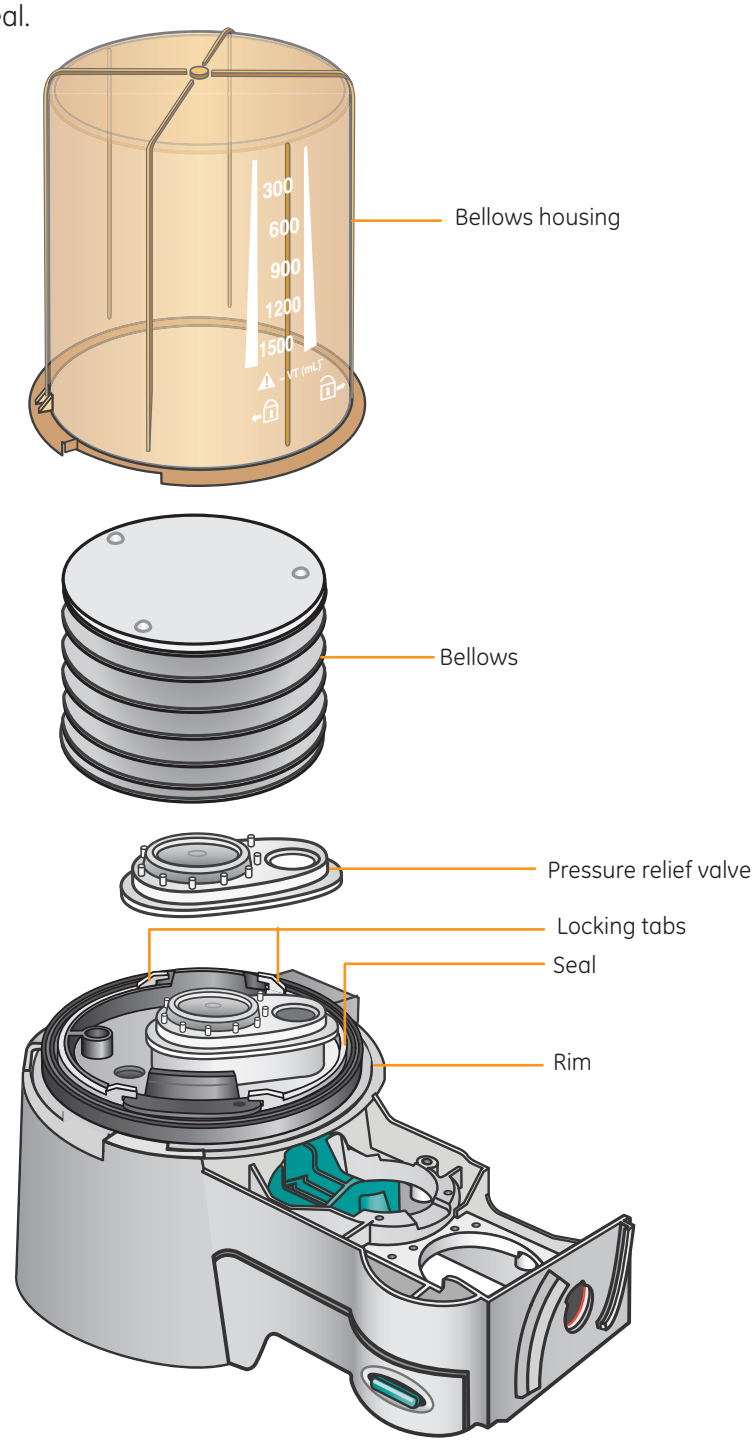


Figure 2.61 Bellows Assembly

Assemble the bellows assembly:

1. Install the seal and verify the arrow and the groove on the seal point up.
2. Push the latch toward the center and attach the locking tabs.
3. Install the pressure relief valve.
4. Push the two tabs toward the center and install the rim. A click should be heard when the rim is installed.
5. Attach the bottom edge of the bellows to the rim. Verify that the bottom ring of the bellows is fitted over the rim.
6. Lower the bellows housing and turn it clockwise to lock. Verify housing is secure and scale markings are facing forward.

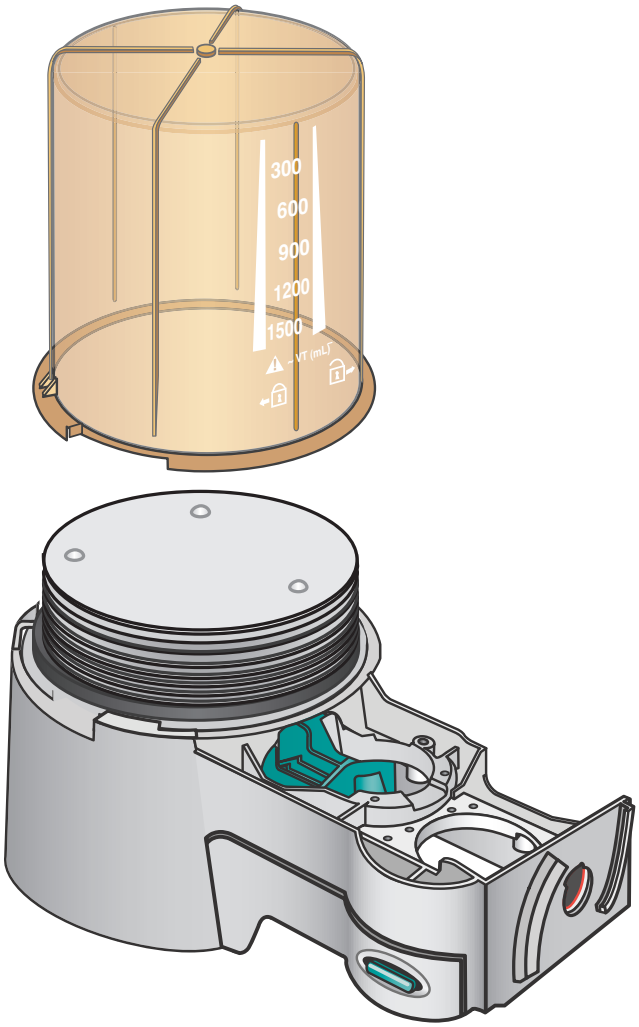


Figure 2.62 Bellows Assembly and Canister

Bellows assembly test (Verify the bellows is assembled correctly):

Your class instructor will demonstrate the proper method for testing the Bellows Assembly.

Exhalation Valve

Remove the exhalation valve assembly:

1. With the breathing system removed, the exhalation valve assembly can be removed.
2. Loosen the thumbscrews and lift the assembly off.

Replace the exhalation valve assembly:

1. Replace the exhalation valve assembly and tighten the thumbscrews.

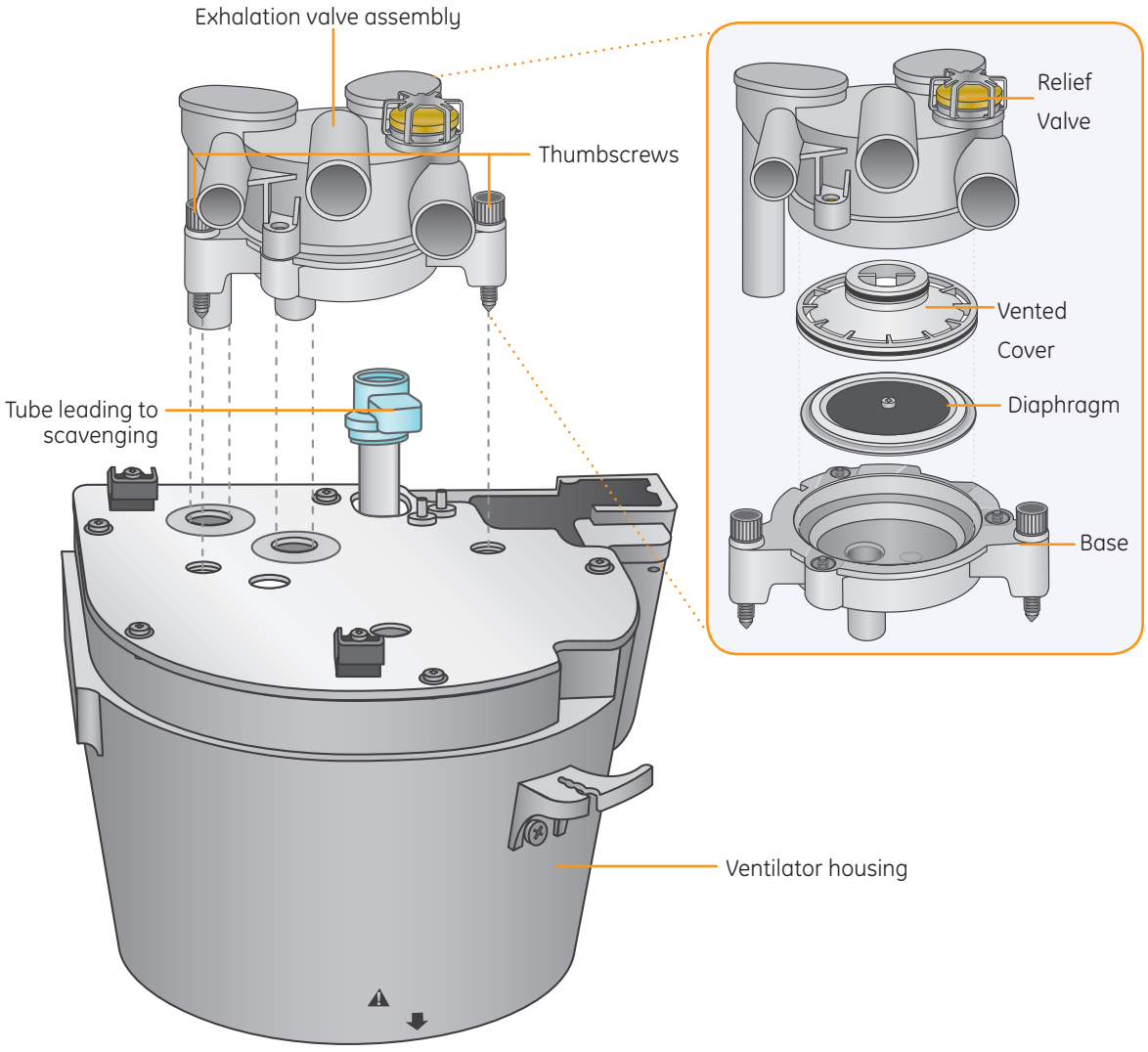


Figure 2.63 Exhalation Valve

3 Resources

Aespire View User Operational Maintenance Schedule

Activity	Frequency
Full Anesthesia System Checkout	**Daily:** (URM sect. 4-2)
Flow Sensor Calibration	**Daily:** (URM sect. 4-2)
Flow Sensor Replacement	**PRN:** Typically 6 months (URM sect. 7-3)
Suction Overflow Trap	**PRN:** (URM sect. 7-3)
Empty Condenser Reservoir	**Daily and PRN:** (URM sect. 7-3)
Change Absorbent Canister	**When Inspired CO_2 is observed:** level dependent on hospital policy (URM sect. 8-6)

Aespire View Anesthesia Supplies and Accessories

Part Number	Description
Flow Sensor Supplies	
**1503-3858-000	(Flow sensors (off-set)
1407-3003-000	Flow sensor module (reusable)
Breathing System Supplies	
**8003138	Medisorb multi absorber, disposable 6/box (each lasts about 8 continuous hours)
8004515	Reusable, hytrel patient tubing 36" (for use on bag arm)
8004459	ABS Bag arm connector elbow (for use on bag arm)
8004454	Manual vent bag arm hose and elbow, disposable
2900-0001-000	Stopper test plug – used for low-pressure leak test
1503-3857-000	O_2 sensor plug
8004460	3L Scavenging Bag, Reusable
1407-3200-000	Reusable CO_2 Canister with handle
1407-3201-000	Disposable CO_2 Foam Filter (pack of 40)
Vaporizer Supplies	
1100-3025-000	Easy Fill Bottle Adapter, Isoflurane
1100-3026-000	Easy Fill Bottle Adapter, Halothane
1100-3027-000	Easy Fill Bottle Adapter, Enflurane
1100-3028-000	Easy Fill Bottle Adapter, Sevoflurane
1104-3025-000	Vaporizer "O" ring

**These items are supplies that will be used regularly and should be stocked. The others are for reserve or back-up and are optional.

For supplies issues, questions, and orders, please contact:

Aespire View Troubleshooting Guide

Taken from pages 6-4 through 6-8 of the User's Reference Manual

Message	Cause	Action/Concern
Apnea >120s	No mechanical breaths or spontaneous breaths greater than 5 ml in last 120 seconds.	Check the patient. Bag as needed. Check for disconnects. If the patient is on a heart lung machine, select Cardiac Bypass from the Main menu.
Check flow sensors	System has detected an improper flow pattern in breathing circuit.	Check if the flow sensors are correctly installed. Check for water buildup in the flow sensor tubes. Inspect one way valves (breathing circuit module.) Check the condition of the flow sensor and its tubing.
Circuit leak	Exhaled volume less than 50% of inspired volume for at least 30 seconds (mechanical ventilation).	Check breathing circuit and flow sensor connections. Patient circuit leak audio can be turned off in the Alarm Setup menu.
No exp flow sensor; No insp flow sensor	Electrical signals show the flow sensor is not connected.	Connect the flow sensors. Make sure the flow sensor module is in all the way.
PEEP high. Blockage?	Paw ≥ sustained limit for 15 seconds.	Check tubing for kinks, blockages, disconnects. Check scavenging. Calibrate the flow sensors.
Plug in power cable. On battery.	The mains supply is not connected ***or*** has failed and the system is using battery power.	Ventilate manually to save power. At full charge, the battery permits approximately 90 minutes of mechanical ventilation. Make sure power is connected and circuit breakers are closed.
Reverse exp flow.	Flow toward the patient seen in the expiratory flow sensor during inspiration for six breaths in a row.	Look at the check valves. Check for water buildup in the flow sensor tubes. Check the flow sensor condition. Replace the expiratory check valve.
Reverse insp flow.	Flow through inspiratory sensor during expiration for six breaths in a row.	Look at the check valves. Check for water buildup in the flow sensor tubes. Check the flow sensor condition. Replace the expiratory check valve.
TV not achieved	Tidal volume measured by inspiratory flow sensor is less than the set value for six breaths in a row after the first minute of mechanical ventilation.	Adjust controls to supply adequate tidal volumes. Check I:E, Pmax, and volume settings. Possible leak. Modify settings or check for system leaks.
Unable to drive bellows	Manifold pressure is greater than Paw.	Check the drive gas. Increase fresh gas flow (or push O_2 flush button) to fill bellows.
Vol vent only. No PEEP or PSV.	Manifold pressure error. Pressure Control unavailable.	Continue to use volume control ventilation or ventilate manually. Shut down system as soon as possible. Contact a Datex-Ohmeda trained service representative.

4 Clinical Training Documents

Clinical Training Checklist

The following topics will be presented.

Place a checkmark next to topics discussed.

☐ The purpose of this document is to verify that the following items are covered during your Aespire View training. Training sessions have been separated into two sections. The lecture portion of the training is approximately 60 minutes in duration. The hands-on portion for practice and return demonstrations is approximately 60 minutes in duration, as well. Please plan to be in the training class for the entire time that your manager has assigned.

☐ You will be given a Training Quiz and a Course & Instructor Evaluation at the end of the class. The evaluation needs to be returned with the completed quiz to your manager. Your manager will give you all of the correct answers to the quiz once you complete it.

☐ You should be prepared to operate the Aespire View by the end of the training time. If you still believe that you are not prepared, please talk to your trainer or your manager. Please refer to the Aespire View User's Reference Manuals for complete instructions on the operation of the Aespire View Anesthesia System.

Introduction to the Aespire View

☐ Electrical and pneumatic systems including battery back-up power

☐ Gas regulation and flow control

- Flow controls, Auxiliary O_2

☐ Vaporization

- Filling the Tec 7 vaporizers
- Remove and replace the Tec 7 vaporizers

☐ Gas management and scavenging

- Bag/Vent switch
- APL valve
- Changing CO_2 absorber canister
- Scavenging

☐ Flow Sensors

- Theory of operation
- Calibration
- Moisture issues

☐ Complete machine checkout procedures

Clinical Training Checklist *Continued*

- ☐ Start and End case procedures
- ☐ Ventilation
  - Basic Modes: Volume Control, Pressure Control
- ☐ Advanced Ventilation Modes
  - Synchronized Intermittent Mandatory Ventilation (SIMV)
  - Pressure Support Ventilation (PSVPro)
  - Synchronized Intermittent Mandatory Ventilation Pressure (SIMV-PC)
  - Pressure Control Ventilation-Volume Guaranteed (PCV-VG)
- ☐ Alarm Management & Cardiac Bypass
- ☐ Maintenance and Troubleshooting
- ☐ Hands-on exercises
- ☐ Return Demonstrations – see attached
- ☐ Training Quiz
- ☐ Course & Instructor Evaluation

Employee Signature: _____ Date:_____

Clinical Trainer Signature: _____ Date:_____

Clinical Training Return Demonstration

The instructor will verify that you can perform the following functions on the Aespire View anesthesia machine:

Place a check mark next to each task that is verified.

- ☐ Demonstrate the ability to calibrate (remove and replace) the flow sensor module.
- ☐ Demonstrate the ability to remove and reconnect the CO_2 absorber canister.
- ☐ Demonstrate the ability to perform a complete machine check.
  - Pipeline test
  - Cylinder test
  - Flow Controls test
  - Vaporizer Back Pressure test
  - Negative Low-Pressure Leak test
  - Alarm test
  - Bellows test
  - Circuit test
  - APL Valve test
- ☐ Demonstrate the ability to start a case, starting with the machine that is turned off.
- ☐ Demonstrate the ability to fill a Tec 7 vaporizer.
- ☐ Demonstrate the ability to completely set ventilator parameters and then change from one mode of ventilation to another.
- ☐ Demonstrate the ability to put the machine into Cardiac Bypass.
- ☐ Demonstrate the ability to change alarm limits, use the Alarm Silence and Volume Alarms keys.
- ☐ Demonstrate the ability to end a case to put alarms into standby.
- ☐ Turn suction on to maximum. Change to regulated suction and adjust suction pressure.

Name: _____ Date:_____

Clinical Educators Name: _____ Date:_____

Clinical Training Quiz

After completion of the test, compare your answers to the answer key. Ask the instructor to explain any answers you do not understand.

Circle the correct answer.

1. How long with the battery provide power to the machine when fully charged and under normal use?
   - **A.** 15 minutes
   - **B.** 90 minutes
   - **C.** 4 hours
   - **D.** 8 hours

2. Where is the pipeline and tank pressures displayed?
   - **A.** Rear of the machine
   - **B.** On the ventilator display
   - **C.** Front of the machine
   - **D.** Side of the machine

3. A Preoperative Checkout should be performed
   - **A.** Once a week
   - **B.** Once a month
   - **C.** Every day before your first patient
   - **D.** Every two weeks

4. What is the purpose of the End Case key?
   - **A.** Minimizes alarms between cases
   - **B.** Shuts down power to the machine
   - **C.** Automatically turns vaporizers off
   - **D.** Activates Cardiac Bypass mode

5. It is possible to delivery 100% N_2O to the patient through the Aespire View.
   - **A.** True
   - **B.** False

6. How is patient gas carried between the rebreathing bag and the ABS (Advanced Breathing System)?
   - **A.** Through the bag arm
   - **B.** Through the bag hose

7. The 7900 smart vent can automatically compensate for:
   - **A.** Changes in fresh gas flow
   - **B.** Small system leaks
   - **C.** Depth of anesthesia
   - **D.** Both A and B

Clinical Training Quiz *Continued*

8. During Pressure Control Ventilation (PCV), what is the typical pressure waveform pattern?
   - **A.** Square wave pattern
   - **B.** "Shark fin" wave pattern
   - **C.** Decelerating wave pattern

9. An active alarm can be silenced for _____ seconds.
   - **A.** 30
   - **B.** 60
   - **C.** 90
   - **D.** 120

10. An anticipated alarm can be pre-silenced for _____ seconds.
   - **A.** 30
   - **B.** 60
   - **C.** 90
   - **D.** 120

11. High priority warning alarms display white text and what color background?
   - **A.** Red
   - **B.** Yellow
   - **C.** White

12. PSVPro is a mode of ventilation that works well with paralyzed patients.
   - **A.** True
   - **B.** False

13. What is primary the purpose of the scavenging system?
   - **A.** Provides 100% O_2 to the O_2 flush system
   - **B.** Provides the gas mixture to the vaporizers
   - **C.** Removes waste gases from the machine and out of the operating room

14. At the end of the machine checkout, the APL valve (pop off) should be placed in what position?
   - **A.** 70 cmH_2O
   - **B.** Minimum
   - **C.** 30 cmH_2O

15. Flow sensors measure airway flow, calculate pressure changes, and display both inspiratory and expiratory volumes on the ventilator screen.
   - **A.** True
   - **B.** False

Clinical Training Quiz *Continued*

16. PSVPro defaults to which ventilation mode as an apnea backup?
    - **A.** PCV
    - **B.** SIMV-PC
    - **C.** SIMV/PSV
    - **D.** PCV-VG
17. The ventilator does not have to be on to provide Pressure Support Ventilation.
    - **A.** True
    - **B.** False

18. How often should the flow sensors be calibrated?
    - **A.** Daily
    - **B.** Weekly
    - **C.** Bi-Weekly
    - **D.** Monthly

19. What is the purpose of the Volume Alarms key on the ventilator display?
    - **A.** Temporarily silences any active alarms
    - **B.** Permanently silences any active alarms
    - **C.** Mutes the audio tone for alarms
    - **D.** Turns the volume alarms (tidal volume and minute volume) on and off

20. SIMV mode can be chosen to deliver volume or pressure breaths.
    - **A.** True
    - **B.** False

Clinical Training Quiz Answer Sheet

1. How long with the battery provide power to the machine when fully charged and under normal use?
   B. 90 minutes

2. Where is the pipeline and tank pressures displayed?
   C. Front of the machine

3. A Preoperative Checkout should be performed
   C. Every day before your first patient

4. What is the purpose of the End Case key?
   A. Minimizes alarms between cases

5. It is possible to delivery 100% N_2O to the patient through the Aespire View.
   B. False

6. How is patient gas carried between the rebreathing bag and the ABS (Advanced Breathing System)?
   B. Through the bag hose

7. The 7900 smart vent can automatically compensate for:
   D. Both A and B

8. During Pressure Control Ventilation (PCV), what is the typical pressure waveform pattern?
   A. Square wave pattern

9. An active alarm can be silenced for _____ seconds.
   D. 120

10. An anticipated alarm can be pre-silenced for _____ seconds.
    C. 90

11. High priority warning alarms display white text and what color background?
    A. Red

12. PSVPro is a mode of ventilation that works well with paralyzed patients.
    B. False

13. What is primary the purpose of the scavenging system?
    C. Removes waste gases from the machine and out of the operating room

14. At the end of the machine checkout, the APL valve (pop off) should be placed in what position?
    B. Minimum

15. Flow sensors measure airway flow, calculate pressure changes, and display both inspiratory and expiratory volumes on the ventilator screen.
    A. True

16. PSVPro defaults to which ventilation mode as an apnea backup?
    B. SIMV-PC

17. The ventilator does not have to be on to provide Pressure Support Ventilation.
    B. False

18. How often should the flow sensors be calibrated?
    A. Daily

19. What is the purpose of the Volume Alarms key on the ventilator display?
    D. Turns the volume alarms (tidal volume and minute volume) on and off

20. SIMV mode can be chosen to deliver volume or pressure breaths.
    A. True

5 Non-clinical Training Documents

Non-clinical Training Checklist

The following topics will be presented.

Place a checkmark next to topics discussed.

☐ The purpose of this document is to verify that the following items are covered during your Aespire View training. Training sessions have been separated into two sections. The lecture portion of the training is approximately 60 minutes in duration. The hands-on portion for practice and return demonstrations is approximately 60 minutes in duration, as well. Please plan to be in the training class for the entire time that your manager has assigned.

☐ You will be given a Training Quiz and a Course & Instructor Evaluation at the end of the class. The evaluation needs to be returned with the completed quiz to your manager. Your manager will give you all of the correct answers to the quiz once you complete it.

☐ You should be prepared to operate the Aespire View by the end of the training time. If you still believe that you are not prepared, please talk to your trainer or your manager. Please refer to the Aespire View User's Reference Manuals for complete instructions on the operation of the Aespire View Anesthesia System.

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☐ Gas management and scavenging
- Bag/Vent switch
- APL valve
- Changing CO_2 absorber canister
- Scavenging

☐ Flow Sensors
- Theory of operation
- Calibration
- Moisture issues

Non-clinical Training Checklist *Continued*

- ☐ Complete machine checkout procedures
  - Pipeline test
  - Cylinder test
  - Flow Controls test
  - Vaporizer Back Pressure test
  - Negative Low-Pressure Leak test
  - Alarm tests
  - Bellows test
  - Circuit test
  - APL Valve test
- ☐ Start and End case procedures
- ☐ Maintenance and Troubleshooting
- ☐ Hands-on exercises
- ☐ Return Demonstrations – see attached
- ☐ Training Quiz
- ☐ Course & Instructor Evaluation

Employee Signature: _____ Date:_____

Clinical Trainer Signature: _____ Date:_____

Non-clinical Training Return Demonstration Anesthesia Technician/Biomed Technician

The instructor will verify that you can perform the following functions on the Aespire View anesthesia machine:

Place a check mark next to each task that is verified.

- ☐ Demonstrate the ability to calibrate (remove and replace) the flow sensor module.
- ☐ Demonstrate the ability to remove and reconnect the CO_2 absorber canister.
- ☐ Demonstrate the ability to empty water from the condenser reservoir.
- ☐ Demonstrate the ability to power on the machine when the power is off.
- ☐ Demonstrate the ability to end a case to put alarms into standby.
- ☐ Demonstrate the ability to perform a complete machine check.
  - Pipeline test
  - Cylinder test
  - Flow Controls test
  - Vaporizer Back Pressure test
  - Negative Low-Pressure Leak test
  - Alarm test
  - Bellows test
  - Circuit test
  - APL Valve test
- ☐ Demonstrate the ability to fill a Tec 7 vaporizer.
- ☐ Turn suction on to maximum. Change to regulated suction and adjust suction pressure.
- ☐ Demonstrate the ability to replace/clean suction overflow trap.

Name: _____ Date:_____

Clinical Educators Name: _____ Date:_____

Non-clinical Training Quiz

After completion of the test, compare your answers to the answer key. Ask the instructor to explain any answers you do not understand.

Circle the correct answer.

1. How long with the battery provide power to the machine when fully charged and under normal use?
   - **A.** 15 minutes
   - **B.** 90 minutes
   - **C.** 4 hours
   - **D.** 8 hours

2. Where is the pipeline and tank pressures displayed?
   - **A.** Rear of the machine
   - **B.** On the ventilator display
   - **C.** Front of the machine
   - **D.** Side of the machine

3. What will happen on a machine with a charged battery if the system switch is turned on, and the system circuit breaker (main switch on the rear of the machine) is turned off?
   - **A.** Nothing, the machine will not power up
   - **B.** The message 'Plug in power cable. On battery' will be displayed
   - **C.** The machine will run on battery
   - **D.** Both B and C

4. The CO_2 absorbent canister can be installed correctly in either direction.
   True **False**

5. A Preoperative Checkout should be performed
   - **A.** Once a week
   - **B.** Once a month
   - **C.** Every day before the first patient
   - **D.** Every two weeks

6. How is patient gas carried between the rebreathing bag and the ABS (Advanced Breathing System)?
   - **A.** Through the bag arm
   - **B.** Through the bag hose

7. What is the purpose of the End Case key?
   - A. Minimizes alarms between cases
   - **B.** Shuts down power to the machine
   - **C.** Automatically turns vaporizers off
   - **D.** Activates Cardiac Bypass mode

Non-clinical Training Quiz *Continued*

8. An active alarm can be silenced for _____ seconds.
   - **A.** 30
   - **B.** 60
   - **C.** 90
   - **D.** 120

9. An anticipated alarm can be pre-silenced for _____ seconds.
   - **A.** 30
   - **B.** 60
   - **C.** 90
   - **D.** 120

10. High priority warning alarms display white text and what color background?
    - **A.** Red
    - **B.** Yellow
    - **C.** White

11. What is primary the purpose of the scavenging system?
    - **A.** Provides 100% O_2 to the O_2 flush system
    - **B.** Provides the gas mixture to the vaporizers
    - **C.** Removes waste gases from the machine and out of the operating room

12. If a vaporizer was improperly installed and had a leak, which of the following tests would most likely find the problem?
    - **A.** Pipeline test
    - **B.** Cylinder test
    - **C.** Flow Control test
    - **D.** Negative Low-Pressure Leak test

13. At the end of the machine checkout, the APL valve (pop off) should be placed in what position?
    - **A.** 70 cmH_2O
    - **B.** Minimum
    - **C.** 30 cmH_2O

14. Flow sensors measure airway flow, calculate pressure changes, and display both inspiratory and expiratory volumes on the ventilator screen.
    True **False**

15. How often should the flow sensors be calibrated?
    - **A.** Daily
    - **B.** Weekly
    - **C.** Bi-Weekly
    - **D.** Monthly

Non-clinical Training Quiz *Continued*

16. What is the purpose of the Volume Alarms key on the ventilator display?
    - **A.** Temporarily silences any active alarms
    - **B.** Permanently silences any active alarms
    - **C.** Mutes the audio tone for alarms
    - **D.** Turns the volume alarms (tidal volume and minute volume) on and off

17. The gas cylinder valves should be in what position if the pipeline supply is in use?
    - **A.** Closed
    - **B.** Fully open
    - **C.** 50%

18. It is OK to fill a vaporizer while the vaporizer is in use and turned on.
    True **False**

Non-clinical Training Quiz Answer Sheet

1. How long with the battery provide power to the machine when fully charged and under normal use?
   B. 90 minutes

2. Where is the pipeline and tank pressures displayed?
   C. Front of the machine

3. What will happen on a machine with a charged battery if the system switch is turned on, and the system circuit breaker (main switch on the rear of the machine) is turned off?
   D. Both B and C

4. The CO_2 absorbent canister can be installed correctly in either direction.
   False

5. A Preoperative Checkout should be performed
   C. Every day before the first patient

6. How is patient gas carried between the rebreathing bag and the ABS (Advanced Breathing System)?
   B. Through the bag hose

7. What is the purpose of the End Case key?
   A. Minimizes alarms between cases

8. An active alarm can be silenced for _____ seconds.
   D. 120

9. An anticipated alarm can be pre-silenced for _____ seconds.
   C. 90

10. High priority warning alarms display white text and what color background?
    A. Red

11. What is primary the purpose of the scavenging system?
    C. Removes waste gases from the machine and out of the operating room

12. If a vaporizer was improperly installed and had a leak, which of the following tests would most likely find the problem?
    D. Negative Low-Pressure Leak test

13. At the end of the machine checkout, the APL valve (pop off) should be placed in what position?
    B. Minimum

14. Flow sensors measure airway flow, calculate pressure changes, and display both inspiratory and expiratory volumes on the ventilator screen.
    True

15. How often should the flow sensors be calibrated?
    A. Daily

16. What is the purpose of the Volume Alarms key on the ventilator display?
    D. Turns the volume alarms (tidal volume and minute volume) on and off

17. The gas cylinder valves should be in what position if the pipeline supply is in use?
    A. Closed

18. It is OK to fill a vaporizer while the vaporizer is in use and turned on.
    False

Course Evaluation

Aespire View 6.X

Course Name:_____ Date: _____

Location:_____ Instructor:_____

Please complete the following survey. The information you provide will help us to improve the course for future learners.

Rate the training by circling the appropriate number

Course Content	4 = Strongly agree	3 = Agree	2 =Disagree	1 = Strongly disagree	
The content covered the topics adequately and clearly.	4	3	2	1	NA
The activities/exercises helped me learn the content presented.	4	3	2	1	NA
The participant guide was easy to follow.	4	3	2	1	NA
The knowledge checks and/or assessments in this course were effective in helping me validate my existing and acquired knowledge.	4	3	2	1	NA
Comments:					

Instructor Delivery	4 = Strongly agree	3 = Agree	2 =Disagree	1 = Strongly disagree	
Instructor was prepared for the training session.	4	3	2	1	NA
Instructor was knowledgeable about the course content.	4	3	2	1	NA
Instructor effectively presented the course content.	4	3	2	1	NA
Instructor effectively responded to student questions.	4	3	2	1	NA
Comments:					

Course Experience	10 = Strongly agree								1 = Strongly disagree	
Rate your overall satisfaction with the course content.	10	9	8	7	6	5	4	3	2	1
Rate your overall satisfaction with the Instructor delivery.	10	9	8	7	6	5	4	3	2	1
I would recommend this training course to a friend or colleague.	10	9	8	7	6	5	4	3	2	1
Comments:										

Would you like to be contacted in the future for further inputs on our training development, delivery, and operations processes?

☐ **No** ☐ **Yes** If yes, please provide your name and email ID here:_____

Healthcare Re-imagined

GE is dedicated to helping you transform healthcare delivery by driving critical breakthroughs in biology and technology. Our expertise in medical imaging and information technologies, medical diagnostics, patient monitoring systems, drug discovery, and biopharmaceutical manufacturing technologies is enabling healthcare professionals around the world to discover new ways to predict, diagnose and treat disease earlier. We call this model of care "Early Health." The goal: to help clinicians detect disease earlier, access more information and intervene earlier with more targeted treatments, so they can help their patients live their lives to the fullest. Re-think, Re-discover, Re-invent, Re-imagine.

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