S/5 Aespire

Quick Reference Guide
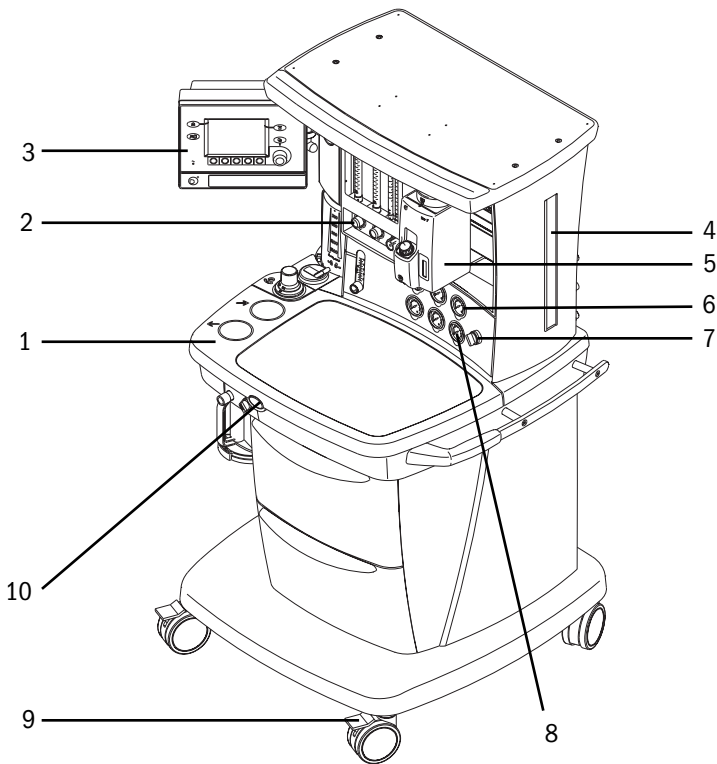
Anesthesia system controls

⚠ **WARNING**   Explosion Hazard. Do not use Aespire systems with flammable anesthetic agents.

Do not use antistatic breathing tubes or masks. They can cause burns if you use them near high frequency surgical equipment.
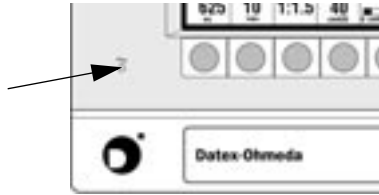

1. Breathing system
2. Flow controls
3. Ventilator / monitoring display
4. Dovetail rails
5. Vaporizer
6. Pipeline pressure gauge(s) (upper row)
7. System switch
8. Cylinder pressure gauge(s) (lower row)
9. Brake
10. O_2 flush button

Turn on the system
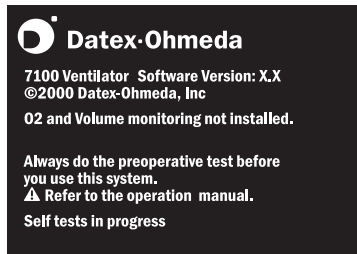
Step 1

Connect the power cord to a wall outlet.

- The mains indicator comes on when AC power is connected.

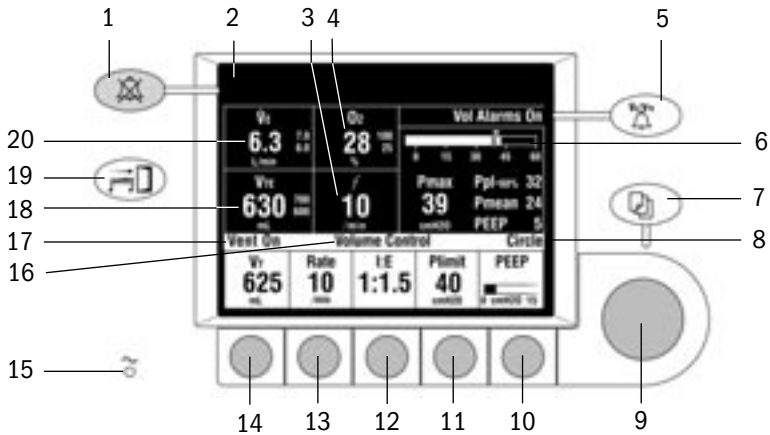### Step 2

Set the system switch to on (I).

(On)

- The display shows the power-up screen, and the system does a series of self tests.
- If the self tests pass, the normal display appears.
- If a test fails, the screen shows an alarm.

Datex·Ohmeda

7100 Ventilator Software Version: X.X
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O2 and Volume monitoring not installed.

Always do the preoperative test before you use this system.
⚠ Refer to the operation manual.

Self tests in progress

$\dot{V}_E$	O2	Vol Alarms Standby
4.3 2.8 L/min	**39** 93 21 %	0 15 30 45 60
V$_{TE}$	f	Pmax
1000 Off mL		Pmean

Vent Off

Adjust settings? To start mech vent set Bag/Vent switch to Vent.

V$_T$	Rate	I:E	Plimit	PEEP
300 mL	**12** /min	**1:2**	**40** cmH20	Inactive Off

7100 controls and monitored data

1. Alarm silence / suspend key
2. Alarm message display
3. Measured value
4. Measured value
5. Volume alarms On/Off key
6. Pressure bar graph
7. Menu key
8. Circuit description
9. Control knob
10. PEEP selection key
11. P$_{limit}$ selection key
12. I:E ratio selection key
13. Breathing rate selection key
14. Tidal volume (V$_T$) or airway pressure (P$_{insp}$) selection key
15. Mains indicator light
16. Ventilation mode
17. Mechanical ventilation status (On or Off)
18. Measured value
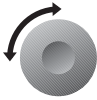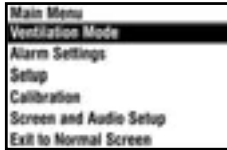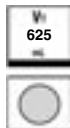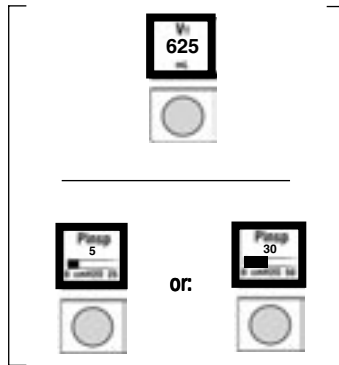19. End case key
20. Measured value

Menu map

Main Menu	
Ventilation Mode	
Alarm Settings	
Setup	
Calibration	
Screen and Audio Setup	
Exit to Normal Screen	

Main Menu	
Ventilation Mode	**Volume Control**
Alarm Settings	Pressure Mode *
Setup	
Calibration	
Screen and Audio	
Exit to Normal Screen	

Alarm Settings **

O2	25	100
VE	6.0	7.0
VTE	600	700
Circuit Leak	Audio On	
Cardiac Bypass	In Progress	
Go to Main Menu		

Setup	
Inspiratory Pause	**Off**
Heliox Mode	Off
About Ventilator...	
Go to Main Menu	

Calibration	
O2 Sensor Cal	
Go to Main Menu	

Screen and Audio Setup	
Screen Contrast	**36**
Alarm Loudness	5
Alarm Limits	Show
Units of Measure	Show
Go to Main Menu	

* Pressure Mode is optional.

** If the Alarm Settings page shows
   V_E Auto Limits during mechanical
   ventilation, the system automatically
   calculates alarm limits according to ventilator parameters.

Set the ventilation mode

Main Menu
Ventilation Mode
Alarm Settings
Setup
Calibration
Screen and Audio Setup
Exit to Normal Screen

Main Menu
Ventilation Mode | Volume Control
Alarm Settings | Pressure Mode
Setup
Calibration
Screen and Audio
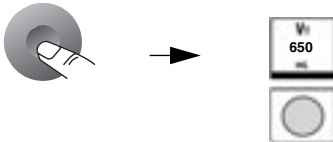Exit to Normal Screen

Volume Control
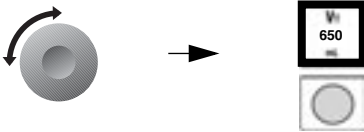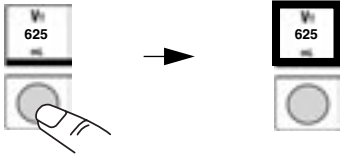**Pressure Mode**

V
625
mL

Pinsp
5

Pinsp
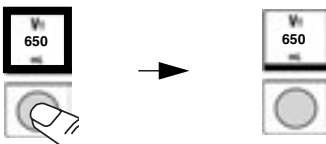30

or:

V
625
mL

or
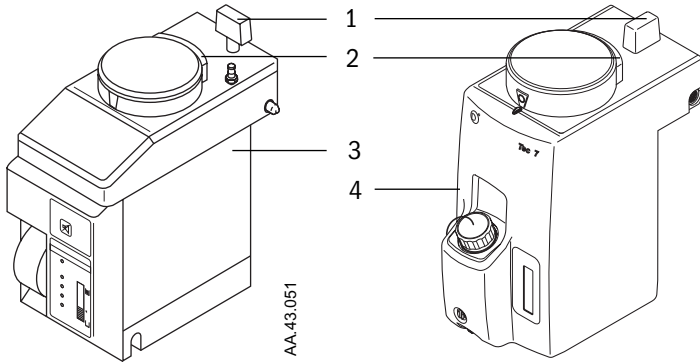
Pinsp

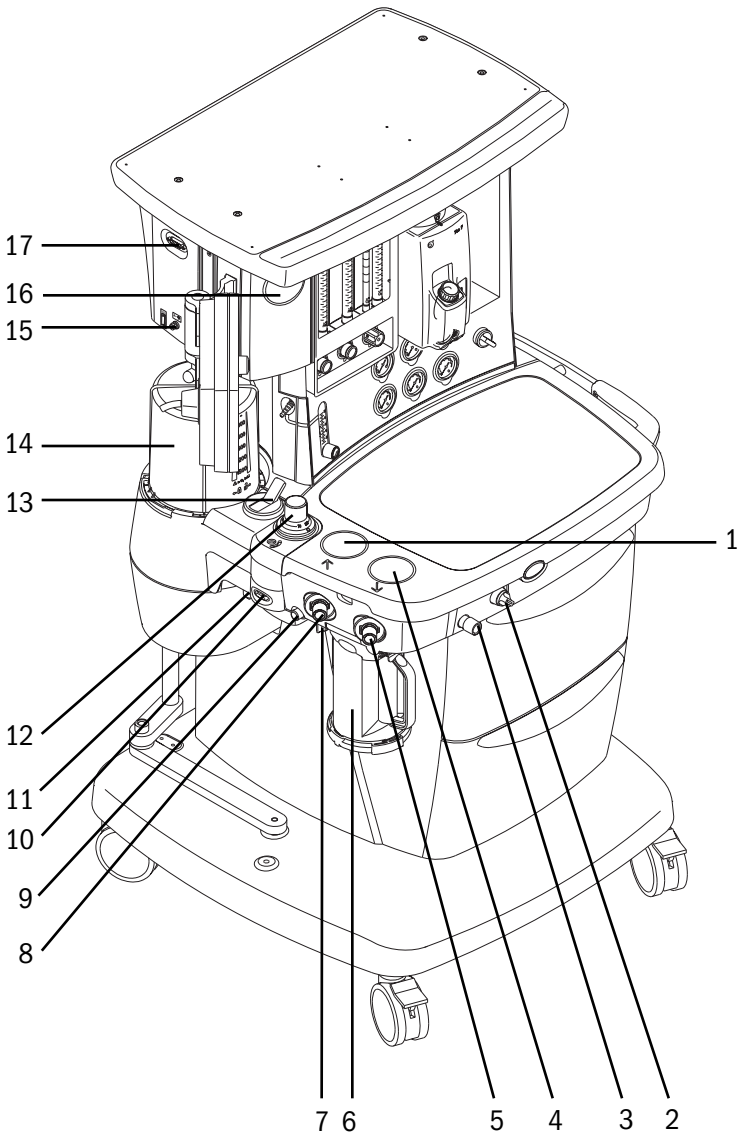# Set ventilator controls

An example of setting controls

or:

Vaporizer controls

AA.43.051

1. Lock Lever
2. Concentration Control and Release
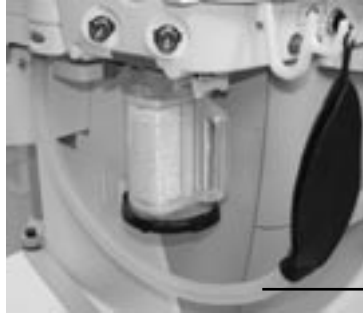3. Tec 6 Plus
4. Tec 7

Breathing system components

18

19

AB.74.p027

1. Expiratory check valve (unidirectional valve)
2. Auxiliary common gas outlet (ACGO) switch
3. ACGO
4. Inspiratory check valve (unidirectional valve)
5. Inspiratory flow sensor or flow port adapter / patient connection (circuit connections)
6. Canister (carbon dioxide absorbent)
7. Canister release
8. Expiratory flow sensor or flow port adapter / patient connection (circuit connections)
9. Leak test plug
10. Breathing system release
11. Manual bag port
12. APL (adjustable pressure-limiting) valve
13. Bag/mechanical ventilation switch
14. Bellows assembly (mechanical ventilation)
15. Sample gas return port
16. Pressure gauge (airway)
17. Serial port
18. Bag arm (optional)
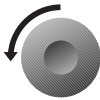19. Manual Bag (optional; no bag arm)

Set the alarm loudness

Show or hide alarm limits and units

Main Menu
Ventilation Mode
Alarm Settings
Setup
Calibration
Screen and Audio Setup
Exit to Normal Screen
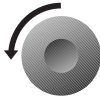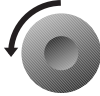
Main Menu
Ventilation Mode
Alarm Settings
Setup
Calibration
Screen and Audio Setup
Exit to Normal Screen

Screen and Audio Setup
Screen Contrast   36
Alarm Loudness   5
Alarm Limits   Show
Units of Measure   Show
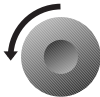
Go to Main Menu

Screen and Audio Setup
Screen Contrast   32
Alarm Loudness   4
Alarm Limits   Show
Units of Measure   Show

Go to Main Menu

Show

Hide

Hide

Turn the Volume Alarms on or off

⚠ **WARNING**   Do not turn off volume alarms with a spontaneously breathing patient. The system will not alarm for low volume.

Use this control during manual ventilation when constant attention is being kept on the patient's ventilation.
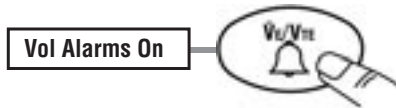
Use the End Case key (on control panel) to prevent volume apnea and alarms between cases. These alarms will reactivate if two breaths are detected within 30 seconds.

Set alarm limits

Main Menu	
Ventilation Mode	
Alarm Settings	
Setup	
Calibration	
Screen and Audio Setup	
Exit to Normal Screen	

Main Menu	
Ventilation Mode	
Alarm Settings	
Setup	
Calibration	
Screen and Audio Setup	
Exit to Normal Screen	

Alarm Settings		
O₂	18	Off
Vₜ	Off	Off
Vₑ	Off	Off
Circuit Leak	Audio On	
Cardiac Bypass	No	
Go to Main Menu		

Alarm Settings		
O₂	25	100
Vₜ	1.5	10.0
Vₑ	120	1900
Circuit Leak	Audio On	
Cardiac Bypass	No Bypass	
Go to Main Menu		

100   →   95

95

Set an audible alarm for circuit leaks

Alarm Settings		
O$_2$	18	100
V̇$_E$	Off	Off
V$_{TE}$	Off	Off
Circuit Leak	Audio Off	
Cardiac Bypass	No	
Go to Main Menu		

Set Cardiac Bypass

Note: Mechanical ventilation must be off. When mechanical ventilation is turned back on, Cardiac Bypass returns to the No setting and monitoring is available.

Main Menu
Ventilation Mode
Alarm Settings
Setup
Calibration
Screen and Audio Setup
Exit to Normal Screen

Main Menu
Ventilation Mode
Alarm Settings
Setup
Calibration
Screen and Audio Setup
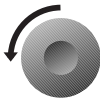Exit to Normal Screen

Alarm Settings
O₂	18	Off
V_T	Off	Off
V_TE	Off	Off
Circuit Leak	Audio On	
Cardiac Bypass	No	
Go to Main Menu		

Alarm Settings
O_2	25	100
$\dot{V}_E$	6.0	7.0
V_{TE}	600	700
Circuit Leak	Audio On	
Cardiac Bypass	**No**	
Go to Main Menu		

Alarm Settings
O_2	No
$\dot{V}_E$	In Progress
V_{TE}	
Circuit Leak	
Cardiac Bypass	
Go to Main Menu	
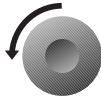
No
In progress

No
In progress

About Alarms

⚠ **WARNING**   If an alarm occurs, safeguard the patient first, before performing troubleshooting or doing repair procedures.

The area at the top of the display (1) shows alarm information. If there are more than four alarms at the same time, the lower priority alarms cycle every two seconds.
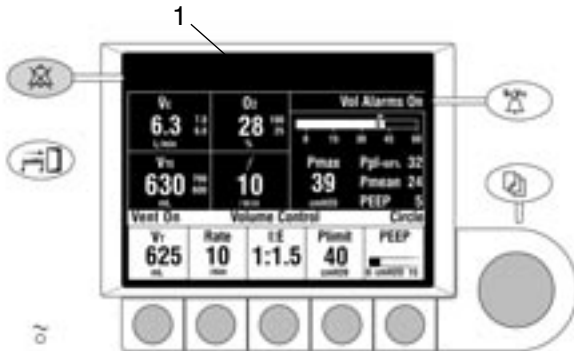
Alarm priority depends on the level of risk to the patient. High priority alarms require immediate attention. If an alarm is related to control settings, the limits flash and a box appears around the parameter.

Priority	Alarm tone	Alarm silence	Note
High	2 bursts of 5 tones, pause, repeat	120 seconds or cannot be silenced	Reverse video. Screen shows elapsed time
Medium	3 tones, 25 second pause, repeat	120 seconds	----
Low	Single tone	Tone does not repeat	----

Alarm messages have three general causes:

1. **Malfunctions.** Some malfunctions cause reduced function (for example no PEEP). Others prevent mechanical ventilation (Minimum shutdown).

2. **Patient monitoring.** These are high and low limit settings that you adjust.

3. **Informational.** Control settings or system conditions can change operation. For example, if the audible circuit leak alarm is Off, the screen shows "Circuit Leak Audio Off" as a low priority alarm.

Alphabetical list of alarm messages

The instructions in this section tell you what you can do:
- During a case to protect the patient.
- After the case to repair a problem.

This table does not include operator instructions.

There are two special types of alarms:

- Minimum monitoring alarms stop mechanical ventilation.
- Minimum shutdown alarms stop mechanical ventilation and monitoring.

Message	Priority	Cause	Action/Concerns	Repair
12 Hour Test ⚠	Low	System in use for more than 12 hours without a power-up self test.	At end of case, move the system switch from On to Standby to On.	Not necessary. Informational.
Battery Charging ⚠	Low	Battery is not fully charged. If power fails, the total backup time will be < 30 minutes.	Leave the system plugged in to charge the battery.	- - -
Cal Flow Sensors	Low	The last flow sensor calibration failed.	Calibrate the flow sensors. Look for water in the flow sensor tubes and dry if necessary. Replace sensor if necessary.	Contact a qualified service representative if calibrating or replacing the sensor does not correct problem.
Check Flw Sensors ⚠	Medium (low after acknowl- edge)	System has detected an improper flow pattern in the breathing circuit.	Are the flow sensors correctly installed? Water build up in the flow sensor tubes? Is a flow sensor tube cracked or broken? Improper check valve operation?	Inspect one way valves (breathing circuit module.) Check the condition of the flow sensor and its tubing.

Message	Priority	Cause	Action/Concerns	Repair
Exp Flow Sensor Fail	Low	System cannot read the calibration data stored in the sensor.	Operation continues with reduced accuracy.	Replace the flow sensor.
Exp Reverse Flow	Medium (low after acknowledge)	Flow through the expiratory sensor during inspiration (for 6 breaths in a row).	Look at the check valves. Water build up in the flow sensor tubes? Is a flow sensor tube cracked or broken?	Replace the expiratory check valve. Check the flow sensor condition.
Insp Flow Sensor Fail	Low	The system cannot read the calibration data stored in the sensor.	Operation continues with reduced accuracy.	Replace the flow sensor.
Insp Reverse Flow	Medium (low after acknowledge)	Flow through the inspiratory sensor during expiration (for 6 breaths in a row).	Look at the check valves. Water build up in the flow sensor tubes? Is a flow sensor tube cracked or broken?	Replace the inspiratory check valve. Check the flow sensor condition.
Inspiration Stopped ⚠	High	Drive gas safety switch activated (high pressure).	Adjust controls. Check systems for blockages.	Contact a qualified service representative if problem continues.
Low Drive Gas Press	Medium	The ventilator does not detect supply pressure.	Manually ventilate the patient.	Make sure that the appropriate gas supplies (O_2 or air) are connected and pressurized.
Low P_{aw}	High	Paw does not rise at least 4 cm above P_{min} during the last 20 seconds.	Are circuit connections Ok? Look at the Paw gauge on the absorber.	Look for circuit disconnection.

Message	Priority	Cause	Action/Concerns	Repair
Monitoring Only	Medium	A severe malfunction prevents mechanical ventilation. Other alarms may also occur.	Ventilate manually. Cycle system power (On- Standby-On). If the alarm clears, restart mechanical ventilation.	Contact a qualified service representative.
No O_2 pressure	High (cannot be silenced)	The O_2 supply has failed.	Air flow will continue. Ventilate manually if necessary. Connect a pipeline supply or install an O_2 cylinder.	- - -
On Battery - Power OK?	Medium (low after acknowl-edge)	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 approx. 30 min of mechanical ventilation.	Make sure power is connected and circuit breakers are closed.
Patient Circuit Leak?	Medium	Exhaled volume <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 settings menu.
P_{aw} < -10 cmH$_2$O	High	Subatmospheric pressure (<-10 cm H$_2$O).	Check patient condition, spontaneous activity? Increase fresh gas flow. Look for high flow through gas scavenging.	Calibrate the flow sensors. With active scavenging, check the negative relief valve on the receiver.
P_{insp} Not Achieved	Low	Indicates a problem with breathing circuit connections or that the ventilator is unable to deliver requested pressure to the patient.	Check breathing circuit connections. Check settings.	---

Message	Priority	Cause	Action/Concerns	Repair
Pres/Vol Mon Inactive	Medium (low after acknowledge)	Outlet selection switch is set to aux. gas outlet.	Connect the patient circuit to the aux. gas outlet or set the switch to the common gas outlet for normal operation.	- - -
Service Calibration ⚠	Low	Internal calibrations are necessary for maximum accuracy.	The system is operational.	Contact a qualified service representative.
Sustained Airway Pressure	Min. shut-down (High)	P_{aw} > 100 cm H_2O for 10 seconds.	Check tubing for kinks, blockages, disconnects.	Calibrate the flow sensors.
Sustained P_{aw}	High	P_{aw} > sustained pressure limit for 15 seconds. *	Check tubing for kinks, blockages, disconnects.	Calibrate the flow sensors.

* The sustained pressure threshold is calculated from the pressure limit setting. The sustained limit is calculated as follows:

Mechanical Ventilation On - Volume Mode

- For $P_{limits} \leq 30$ cm H_2O; the sustained pressure limit is 6 cm H_2O plus Set PEEP.
- For P_{limits} between 30 and 60 cm H_2O; the sustained pressure limit is 20% of the P_{limit} plus Set PEEP.
- For $P_{limits} \geq 60$ cm H_2O; the sustained pressure limit is 12 cm H_2O plus Set PEEP.

Mechanical Ventilation On – Pressure Mode

- Sustained pressure limit is 50% of set P_{insp} or 4 cm H_2O, whichever is greater, plus Set PEEP

    and

- $P_{max} - P_{min}$ must be less than 50% of set P_{insp} or 4 cm H_2O, whichever is greater.

Mechanical Ventilation Off

- For $P_{limits} \leq 60$ cm H_2O; the sustained pressure limit is 50% of the P_{limit} setting.
- For $P_{limits} > 60$ cm H_2O; the sustained pressure limit is 30 cm H_2O.

Message	Priority	Cause	Action/Concerns	Repair
System Leak?	Low	Leak detected between ventilator and patient circuit.	Look for leaks in the absorber system. Problem with flow sensors?	Calibrate the flow sensors. Drain water buildup from the breathing system and inspect for leaks (repair). Inspect or replace flow sensors.
Ventilate Manually	High	A severe malfunction prevents mechanical ventilation and monitoring. Other alarms may also occur.	Ventilate manually. Use a stand-alone monitor. Cycle system power (On- Standby-On). If the alarm clears, restart mechanical ventilation.	Contact a qualified service representative.
Volume Apnea	Medium	No mechanical breaths or spontaneous breaths > 5 mL in last 30 seconds.	Check patient. Bag as needed. Check for disconnects. If the patient is on a heart lung machine, select Cardiac Bypass on the alarm menu.	- - -
Vol Apnea > 2 min	High	No mechanical breaths or spontaneous breaths > 5 mL in last 120 seconds.	Check patient. Bag as needed. Check for disconnects. If the patient is on a heart lung machine, select Cardiac Bypass on the alarm menu.	- - -
V_T Comp Off	Medium (low after acknowl-edge)	The system supplies the set breath but cannot adjust ventilation for compliance and resistance losses, etc.	Adjust V_T manually and continue without compensation, or change to the pressure mode. In pressure mode set P_{insp}.	Inspect the two flow sensors.

Message	Priority	Cause	Action/Concerns	Repair
V$_T$ Comp Disabled	Medium (low after acknowl- edge)	A flow sensor has been connected to a non-active ventilator monitoring feature.	The Volume Compensated Delivery feature is not active on this system.	Contact a qualified service representative for activation of this feature if provided or contact a Datex- Ohmeda sales representative for purchase of this feature.
V$_T$ Not Achieved	Low	Tidal volume measured by inspiratory flow sensor < set value 6 breaths in a row after the first minute of mechanical ventilation.	Adjust controls to supply adequate tidal volumes. Check I:E, P$_{limit}$, and volume settings.	Possible leak. Modify settings or check for system leaks.
V$_{TE}$ > Insp V$_T$	Low	Expired volume > inspired volume for 6 breaths with a circle module.	Check patient condition. Are the flow sensors correctly installed? Water build-up in the flow sensor tubes? Is a flow sensor tube cracked or broken? Improper check valve operation?	Inspect one way valves (breathing circuit module.) Replace flow sensors.
V$_T$ Delivery Too High	Low	V$_T$ > 20% of set value for six consecutive breaths.	Reduce fresh gas flow.	- - -

S/5 Aespire Quick Reference Guide

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