Datex-Ohmeda Aisys CS$^2$: Controls and Basic Operation

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Section 1: Controls
On/off switch
Gas hoses/pipelines

- The gas and vacuum hoses are connected to their pipelines through Schraeder valves.
- They are uni-fit, so misconnection (e.g. of oxygen hose to nitrous pipeline) is not possible.
- The connections at the rear of the machine are different diameters and cannot be interchanged.
• The auxiliary oxygen control is to the left of the vaporiser cartridge. It can be used with an ambu-bag if there is a machine failure.
• Suction controls are to the left of the on/off switch. Select ‘max’ for high suction. Select ‘1’ for adjustable suction and adjust the trim knob to alter suction pressure.
The alternate oxygen control engages automatically if the electronic gas mixer fails.
- If the display fails, it can be turned on using the on/off button.
Alternate oxygen control operation

When the alternate oxygen control is activated, follow instructions on the display
Oxygen flush and auxiliary common gas outlet (ACGO) switch

Oxygen flush: high flow 100% oxygen (bypasses vaporisers)
ACGO (auxiliary common gas outlet): keep switch up to select circle system and down for ACGO. Use the ACGO if a Bain circuit or T-piece type paediatric circuit is used.
Adjustable pressure limiting (APL) valve and ventilator selector switch

**APL valve:** rotate clockwise to increase circuit pressure (max 70cmH$_2$O) for bag ventilation

**Ventilator selector switch** (shown in ventilator ‘on’ position)
The APL valve is only active when the switch is in the ‘reservoir bag’ position (i.e. to the left)

Valve fully open (anticlockwise rotation)

Valve closed (rotated clockwise)

**adjustable pressure limiting outflow valve**

- **minimum opening pressure**
- **medium opening pressure**
- **high opening pressure**
With the ventilator selector switch in the ‘bag’ position, the pressure in the reservoir bag is adjusted using the APL valve.

Patients breathing adequately on their own should normally have the APL valve fully open (i.e. at zero).

To ventilate a patient who is apnoeic, the circuit pressure is increased using the APL valve to allow positive pressure ventilation.
Circle system one-way valves

Expiratory valve:
Opens on expiration and closes with inspiration

Inspiratory valve
(opens on inspiration and closes with expiration)

Flow direction arrows

The valves are discs, which rise or fall depending on the direction of gas flow.
Vaporisers

The CS² uses interchangeable vaporiser cartridges.

1. Locked for use
2. Rotate lever to vertical position, depress trigger and pull cartridge to remove
Gas scavenging

Waste gas is removed through the AGSS (anaesthesia gas scavenging system) to prevent contamination of the operating theatre. It is vented to the atmosphere.

Scavenging flow monitor (located above ventilator bellows): ball hovering in the green zone of the indicator indicates safe operation

Scavenging hose
Carbon dioxide absorber canister and soda lime granules

The granules are pale when unused. Their colour changes due to a chemical change when CO$_2$ is absorbed.

The canister can be removed and replaced very easily (see photo on right). This should be avoided during a case, as the new canister will contain air and dilution of volatile agent will occur when it is inserted.
Menu items are selected with the touch screen and adjusted and confirmed with the com wheel (command wheel). Pressing in the com wheel confirms the setting.
Section 2: Operation
Press start case to begin
Review the default settings and press ‘Start case now’

Changes to default age and weight alter ventilator parameters and MAC calculation
1. Set the ventilator selector switch to bag or ventilator mode.

2. Check APL valve setting if in bag mode. Set at zero for spontaneous breathing or adjust circuit pressure to allow bag ventilation.
Oxygen, gas flow and vaporiser presets

Oxygen, gas flow and vaporiser settings can be adjusted quickly using presets. Tap touch screen to display menu and tap desired preset to select.

**O2 presets:**
- 30%
- 50%
- 60%
- 80%
- 100%

**Combination presets:**
- 100% at 10l/min
- 50% at 1l/min

**Flow presets:**
- 0.5l/min
- 1l/min
- 2l/min
- 4l/min
- 10l/min

**Combination presets:**
- 100% at 10l/min
- 50% at 1l/min

**Sevoflurane presets:**
- Off
- 0.5
- 1.0
- 2.2
- 3.0
- 4.0
Ventilator mode

Flip bag/vent selector to vent position (red arrow) to begin machine ventilation

- The machine defaults to pressure control ventilation-volume guarantee (tidal volume 500ml, rate 12, I:E=1:2 and PEEP off).
- Adjust settings with the touch screen and com wheel
- To select an alternative ventilation mode, touch mode button and select from the menu
Procedures

The procedures button displays a menu to:
• Pause gas flow (e.g. when disconnecting to move a patient)
• Give a vital capacity breath (for pulmonary recruitment)
• Start cardiac bypass mode
Pause gas flow

- Select pause gas flow
- A countdown timer begins from 60 seconds
- Press restart gas flow button to end the pause
Vital capacity breath function

• Select vital capacity from the procedures menu
• Adjust the pressure hold (recommended 30cmH2O) and hold time (recommended 30 seconds)
• Select ‘start vital capacity’ button
End