# UAM VENTILATOR

## QUICK SET UP GUIDE

MAINS
POWER
CABLE

VENTILATOR
DRIVE
HOSE

WHITE
SAMPLE
LINE
(DISTAL TO
PATIENT)

BLUE
SAMPLE
LINE
(PROXIMAL
TO PATIENT)

BELLOWS
ISOLATOR
SWITCH

PATIENT
FILTER

INSPIRATORY
LIMB

FLOW
SENSOR

Y PIECE

EXPIRATORY
LIMB

SCAVENGING
HOSE
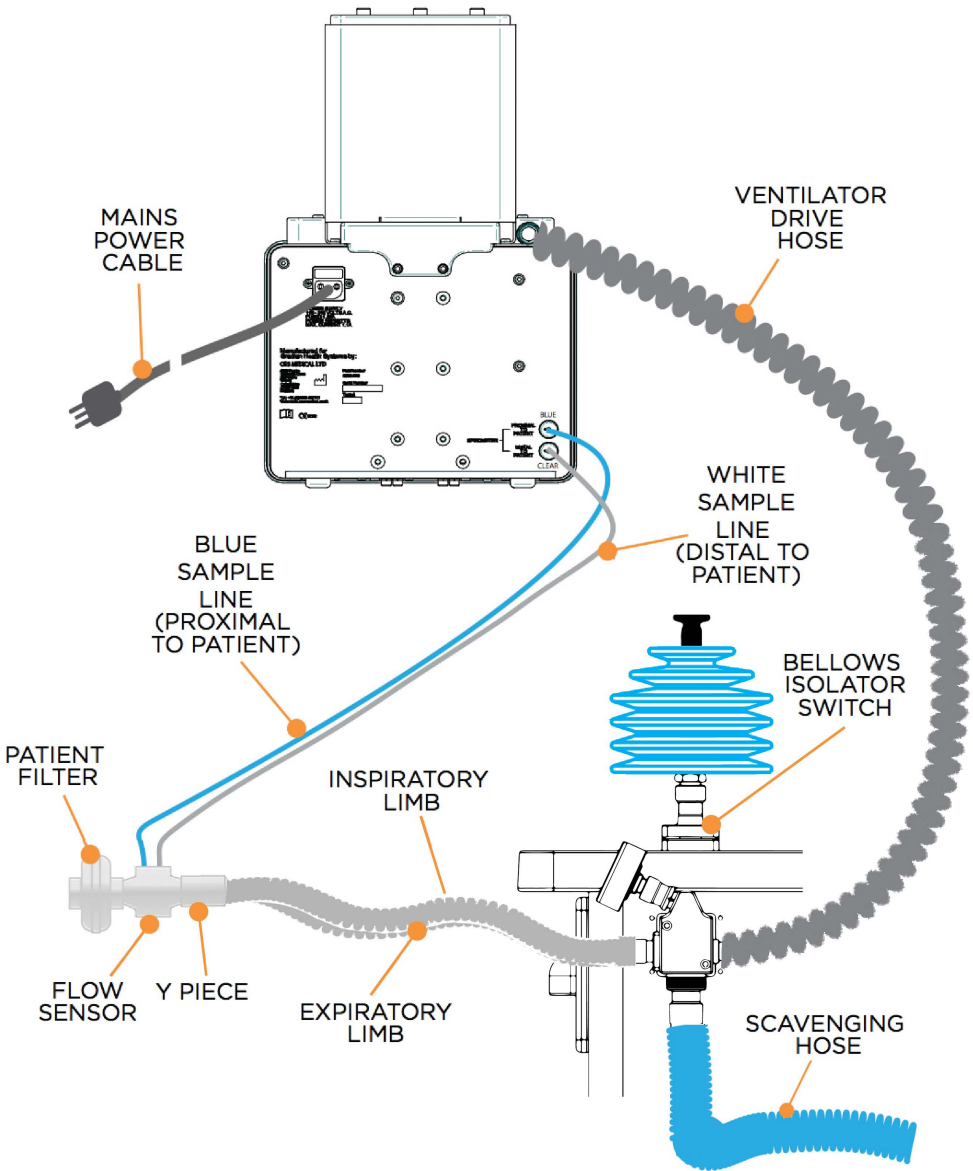
## PREPARING THE UAM AND THE VENTILATOR

1. Ensure that equipment such as the ventilator and the patient monitor are securely attached to the top shelf of the UAM
2. Ensure that all cables and sample lines are correctly attached – refer to the manual of each individual manufacturer.
3. Connect these essential items:
   a. Patient Circuit with Y piece.
   b. Ventilator to UAM using the ventilator drive hose.
   c. Ventilator patient flow sensor between the patient Y piece and the bacteria filter.
   d. Ventilator patient flow sensor sample lines at rear of ventilator
   e. Patient bacterial filter to prevent flow sensor contamination
   f. Theatre anaesthetic gas scavenging system

## VENTILATOR CONNECTIONS

1. Flow sensor connection – The patient inspired and expired gas is measured with a variable orifice flow sensor.
   a. Distal to patient – The clear tube is connected furthest from the patient.
   b. Proximal to patient – blue tube. The blue tube is connected closest to the patient.

**NOTE:** A breathing circuit filter must be used to prevent contamination.

2. Bellows connection – 17 mm male taper that is attached to the UAM anaesthesia machine using a 15 mm x 1.5 m black corrugated breathing hose.
3. Mains power inlet socket-IEC power cable.

## PERFORMING THE PRE-USE CHECKS

1. Check the ventilator for labeling to indicate if the machine has any faults or needs to be serviced
2. Check for visible signs of damage.
3. Check the correct connection of the patient circuit and any auxiliary equipment such as patient monitoring equipment, gas scavenger etc.
4. Perform a patient circuit leak check:
   a. With the patient circuit connected check that all connections are secure and all tubes used are in good condition.
   b. With the UAM anaesthesia machine in manual bellows mode block the patient Y piece and ensure that the manual bellows on the UAM anaesthesia machine can generate 30 cmH2O or more pressure when the bellows is pushed down without the bellows descending due to a leak.
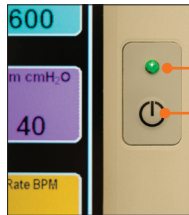
## ISOLATING THE HAND BELLOWS

Push the lever to the rear to isolate the hand bellows and pull it forward when the hand bellows is in use.

The Manual Bellows Isolator lever isolates the Hand bellows from the breathing circuit when the ventilator is being used.



## TURNING THE VENTILATOR ON

To turn the ventilator on press the On/Off push button for 1 second.



MAINS INDICATOR
Yellow: Mains applied
Green: Ventilator ON

ON/OFF
push button

## START UP SELF TEST

If the patient circuit was connected to a patient or a test lung, the ventilator will alert you to remove the Y piece and press to repeat tests.

When the ventilator turns on it will perform a series of self-tests and the bellows will move up and down. The screen will be blank at this time.
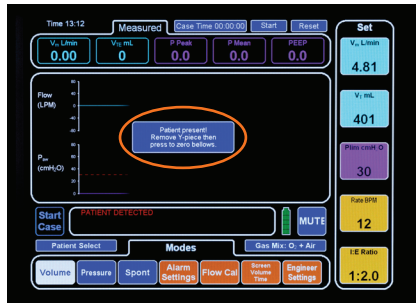


**NOTE:** During these tests, the breathing circuit must be disconnected from the patient.

## PATIENT SELECT SCREEN

Once the self-tests are over the patient select screen will appear.

The patient select screen allows the user to choose patient ventilator settings by weight – 3kg, 10kg, 25kg, 50kg, 70kg and 100kg or by selecting one of 6 user-defined settings.

Connect, pulse oximeter probe, NIBP cuff and ECG leads for patient monitoring.

Patient select screen with body weight setting for 50Kg selected. Note that the selected key is now black and that the ventilator settings for this weight are displayed on the left hand side
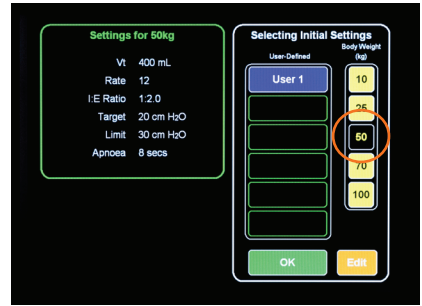
## STARTING THE VENTILATOR

Observe that no alarms are indicated in the alarms dialogue box – this indicates that there are no system errors, including mains power, battery failures. The alarms are disabled until the ventilator is switched to the "start" screen allowing the ventilator to be turned on without nuisance alarms.

Once the user has chosen the initial settings the actual settings can be adjusted as required prior to starting to ventilate. If the settings are to the users satisfaction, pressing the green "Start Case" button shown on the lower left hand side of the display will start the ventilator.

Patient settings are displayed in the "SET" column on the right hand side vertical column. These settings can be adjusted before or during a case. All functions require "OK" to be pressed to confirm the setting change. If the setting change is made and the OK button is not pressed the screen will time out and stay at the original setting.

## ADJUSTING PATIENT SETTINGS

Patient settings are displayed in the "SET" column on the right hand side vertical column. These settings can be adjusted before or during a case. All functions require "OK" to be pressed to confirm the setting change. If the setting change is made and the OK button is not pressed he screen will time out and stay at the original setting.

### MINUTE VOLUME

Minute volume is adjustable between 0.6 and 12 liters per minute.

Press the Vm L/min key to open the keypad. Either toggle the set value up or down with the (+) or (-) keys or type in the new value then press "OK" to confirm and then "EXIT" or wait for the key pad to time out
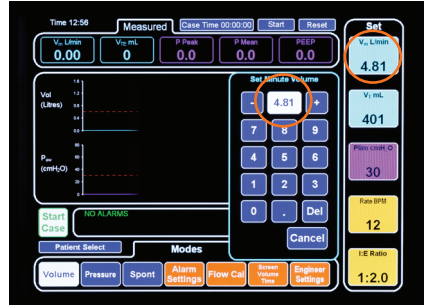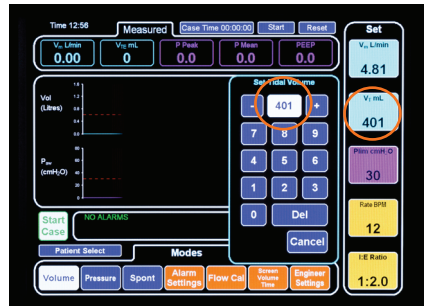


**NOTE:** The cancel key can be used to return the setting to its original value.

### TIDAL VOLUME

Tidal volume is adjustable between 50 and 1000 ml. Press the VT ml key to call out the keypad.

Either toggle the set value up or down with the (+) or (-) keys or type in the new value then press "OK" to confirm and then "EXIT" or wait for the key pad to time out.
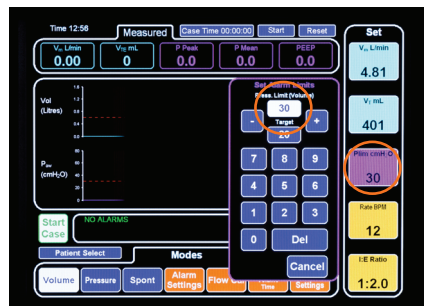


**NOTE:** The cancel key can be used to return the setting to its original value.

### PRESSURE LIMIT

Pressure Limit is adjustable between 10 and 50 cmH20.

Target Pressure is adjustable between 10 and 30 cmH20.

Both "Limit" and "Target" pressures are adjustable. The displayed key in the Set column is dependent on whether the ventilator is in Volume or Pressure mode.

The call out keypad defaults to the relevant alarm level type for the mode that has been selected.

The Target Pressure alarm is relevant only to pressure mode and the Pressure Limit only to volume mode. Note that the pressure limit is automatically adjusted to 10 Cm H2O above peak pressure during ventilation after 3 breaths to maintain patient safety.
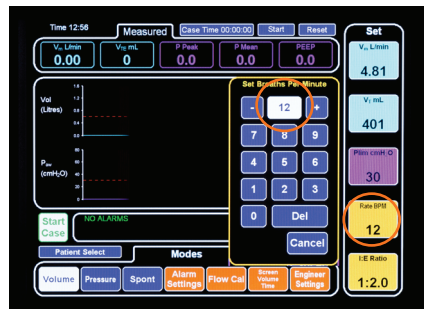
Press the Plim cmH20 or the Ptarg cmH2O key to call out the keypad. Either toggle the set value up or down with the + or - keys or type in the new value then press OK to confirm and then EXIT or wait for the key pad to time out.

**NOTE:** The cancel key can be used to return the setting to its original value.

### BREATHS PER MINUTE (BPM)

The Breaths per minute, or respiratory rate, can be adjusted between 4 and 40 breaths per minute.

Press the "Rate BPM" key to call out the keypad. Either toggle the set value up or down with the (+) or (-) keys or type in the new value then press "OK" to confirm and then "EXIT" or wait for the key pad to time out.
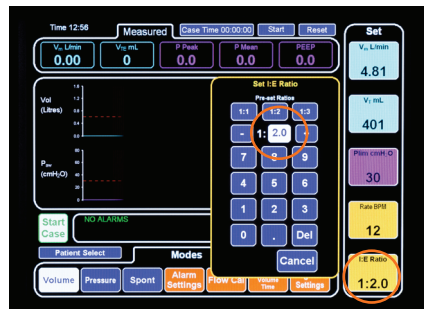


**NOTE:** The cancel key can be used to return the setting to its original value.

### I:E RATIO

The I:E ratio can be adjusted between 1:1 to 1:3 and any value in between.

Press the "I:E Ratio" key to call out the keypad. Either toggle the set value up or down with the (+) or (-) keys, type in the new value or choose a preset value displayed on the top row, then press "OK" to confirm and then "EXIT" or wait for the key pad to time out.



**NOTE:** The cancel key can be used to return the setting to its original value.

## SELECTING VENTILATOR MODES

The following ventilation modes are available:

- Volume Controlled Ventilation (VCV) - delivery of the set tidal or minute volume at a flow determined by the set inspiration time. If the set volume is reached early or the set pressure limit is exceeded then the inspiration phase will end at that time.
- Pressure Controlled Ventilation (PCV) - set target pressure is achieved as quickly as possible during inspiration. The set target pressure is maintained for the remaining inspiration time.
- Spontaneous - patient breathes with no assistance from the ventilator. The ventilator provides measurement of volume, peak, and mean airway pressure. An apnea alarm will sound if the patient stops breathing.

These modes are accessed through the horizontal line of select buttons at the bottom of the screen and are color-coded blue.

### VOLUME MODE

Press the "Volume" mode key to select volume mode.



### PRESSURE MODE

Press the "Pressure" mode key to select pressure mode.



### SPONTANEOUS MODE

Press the "Spont" mode key to select Spontaneous mode. All mechanical ventilation by the ventilator's bellows will cease. Only select this mode if the patient can breathe unaided.

## CHANGING VENTILATION MODE WHEN VENTILATOR IS CYCLING

The ventilation mode can be changed while the patient is being ventilated without stopping ventilation.

A change of mode must always be confirmed to prevent accidental mode change during a case.

Press the key for the new mode required, eg. If changing from volume to pressure. The new mode turns white and a white "Change Mode" key appears.

Press the "Change Mode" key. A confirmation window appears. Press "OK" to confirm change to pressure mode.





## SETTING THE VOLUME ALARM AND THE APNEA TIME

The volume alarm can be set so that the alarm is triggered by a measured value of either Minute Volume or Tidal Volume outside the set limits. Select the desired alarm format and press "EXIT" or wait for the keypad to time out.

The apnea time can be adjusted between 1 and 20 seconds by using the keypad.

Then press "OK" to confirm and then "EXIT" or wait for the keypad to time out.

In the screen pictured the Tidal Volume alarm is selected, the Low Airway Pressure alarm is off and the apnea alarm is set to 8 seconds. Keys for the selections made turn white.
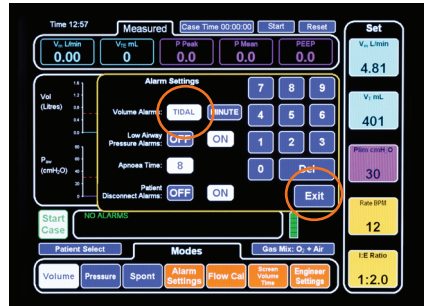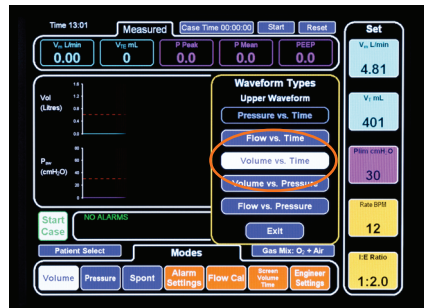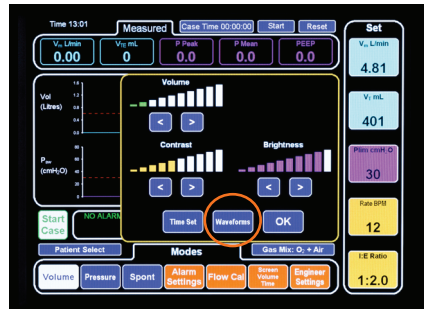
## SETTING THE SCREEN WAVEFORMS

The top screen wave form can be changed to:
a) Flow vs. Time
b) Volume vs. Time
c) Volume vs. Pressure
d) Flow vs. Pressure

Press the Waveform key followed by the key for the type of waveform you wish to use as the top waveform.





**NOTE:** The lower waveform is always pressure vs. time.

## STOPPING THE VENTILATOR

At the end of a procedure pressing the white/red "End Case" button shown on the lower left hand side stops the ventilator. This must be confirmed by pressing the "OK" button on the "End Case" dialogue box.



## TURNING THE VENTILATOR OFF

To turn the ventilator off, the button must be pressed for 2 seconds, and then the user must confirm that the ventilator is required to be shut down before a shutdown sequence will be initiated. If the user does not confirm the requirement to shut down the ventilator will not enter the shutdown sequence.

## CLEANING THE VENTILATOR

The external surfaces of the ventilator can be wiped with a damp cloth followed by drying off prior to clinical use.

**NOTE:** mild antiseptic solutions may be used to clean the ventilator but must be wiped off thoroughly with water on a damp cloth prior to drying. Care must be taken to prevent water entering the machine during cleaning.

## CLEANING THE FLOW SENSOR

The patient flow sensor cannot be autoclaved and should be used with a patient filter to prevent cross contamination. The flow sensor can be given a wash with a mild disinfectant and warm water only. After cleaning and air drying it must be recalibrated.

**NOTE:** Cleaning with alcohol-based solutions will damage the flow sensor and result in unreliable flow measurement readings.

**NOTE:** ensure that the sample tubes are clear of water.
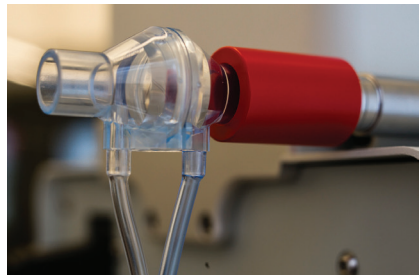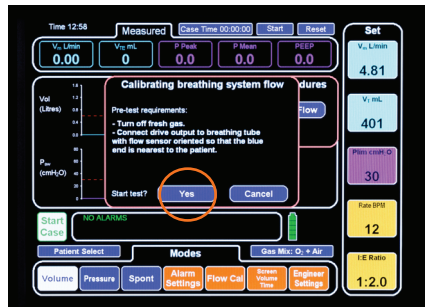
## CALIBRATING THE PATIENT FLOW SENSOR

**NOTE:** The patient flow sensor requires calibration when being used for the first time, periodically once a week, if damage is suspected, and if set volumes and pressures differ from the screen readings.

1.  Disconnect the ventilator drive hose from the ventilator and attach the red plastic adaptor to the 17mm bellows drive taper on the rear of the ventilator bellows assembly.

2.  Connect the patient flow sensor with the flow in the patient direction (blue line closest to patient, clear line closest to ventilator) to first calibrate in the forward direction.

3.  Press the "Flow Cal" button. Then press "Calibrate Patient Flow". Press "yes" to start calibration of the inspired flow.

4.  When prompted, turn the flow sensor around to calibrate the expired flow and press the "continue" button.

5.  When complete press exit.
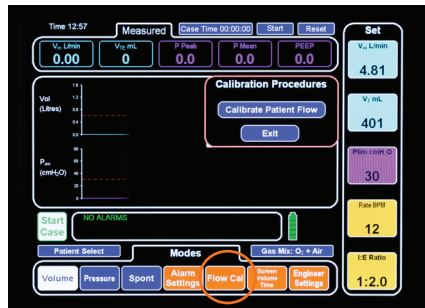
**NOTE:** The ventilator will prompt the user to put the sensor in the correct orientation if connected incorrectly

6.  After calibration reconnect the flow sensor to the patient circuit Y piece and place a clean patient bacterial filter ready for the next case. Reconnect the ventilator drive hose between the bellows 17 mm taper and the UAM anaesthesia machine ventilator connector.

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