

Servo i

Initial Start Up

After the ventilator has completed its self test, the first screen will ask:

Do you want to start Pre-Use Check? Select 'NO'

The Pre-Use check is done by Ventilator Technicians making the machine ready for use. If you select 'YES' in error, you can either cancel the test or it will reach a point where it will fail. The ventilator is still ready for use.

Do you want to delete patient data, trends and event log? Select 'Yes' if you have a new patient. Select 'No' if your patient has just been using ventilator.

Patient Category

Patient category is selected based on the following:

	Tidal Volume	Apnea Alarm Time
Adult	100-4000 mls	15 – 45 seconds
Infant	5 – 350 mls	5 – 15 seconds

Modes of Ventilation

Volume Control- Respiratory Rate and tidal volume are set. The tidal volume is delivered at timed intervals based on rate set. Spontaneous triggered breaths are delivered with the same settings.

Pressure Control- Respiratory Rate, Pressure Control above PEEP and Inspiratory Time are set. The breath rate is delivered at timed intervals and inspiration is held at the set Pressure Control above PEEP for the set Ti. Spontaneous triggered breaths are delivered with the same settings.

PRVC- Respiratory Rate and Tidal Volume are set. When initially connecting to PRVC, the ventilator will deliver a Volume Controlled breath with 10% Pause Time. The measured pause pressure is the pressure level used to deliver the next breath. The ventilator continues to ventilate using a constant pressure and decelerating flow rate. The pressure level is evaluated on a breath to breath basis and adjusts to achieve your set tidal volume. The breath rate is delivered at timed intervals. Any spontaneous triggered breaths are delivered with the same above settings.

Pressure Support/CPAP- With this mode you can give just CPAP, just Pressure Support, or both. To deliver CPAP only, adjust PEEP to desired setting with Pressure Support above PEEP to zero. When the patient initiates inspiration it triggers the ventilator to open the inspiratory valve and the patient can draw in flow. If Pressure Support above PEEP is set then when the patient initiates inspiration the breath is delivered with the set Pressure Support. The patient determines breath rate and inspiratory time.

Volume Support- A target Tidal Volume is set. The patient determines breath rate and inspiratory time. When the patient triggers the ventilator the breath is delivered with a constant pressure to achieve the set target Tidal Volume. The pressure used to deliver the set tidal volume adjusts on a breath to breath basis depending on the patient's breathing ability.

SIMV (Volume Control) + Pressure Support- Respiratory Rate, Tidal Volume, and Ti are set for the mandatory breaths. The ventilator attempts to synchronise with the patient's efforts. There is a synchronous window in which the patient can trigger the ventilator to deliver the Volume Controlled breath. If the patient does not trigger the ventilator, then the Volume Controlled breath will automatically be delivered at the end of the synchronous window. Any time after the mandatory breath has been delivered and within the cycle time, spontaneous breaths can be triggered. Spontaneous breath are pressure supported with set Pressure Support above PEEP.

SIMV (Pressure Control) + Pressure Support- The same as above except your mandatory breaths are delivered with pressure, which is adjusted with Pressure Control above PEEP. Spontaneous breaths triggered above set Respiratory Rate are pressure supported with set Pressure Support above PEEP.

SIMV (PRVC) + Pressure Support- The same as the other SIMV modes above except the mandatory breaths are delivered with PRVC principles. Spontaneous breaths triggered above set Respiratory Rate are pressure supported with set Pressure Support above PEEP.

Back-Up Ventilation- If your patient goes apneic and triggers the Apnea Time Alarm while in Volume Support or Pressure Support/CPAP, then the ventilator goes into Back-Up Ventilation. The respiratory rate is manufacturer set and remaining settings as follows:

Volume Support	Respiratory Rate	Tidal Volume
Adult	15	Set Tidal Volume
Infant	30	Set Tidal Volume

Pressure Support/CPAP	Respiratory Rate	Pressure Control
Adult	15	Set to desired level
Infant	30	Set to desired level

When Back-Up Ventilation is triggered you can either select to stay in the Support Mode or Change Mode. If you choose to Change mode then you must then go into the modes selection and select new mode and settings.

Alarms

When an alarm is violated you have an audible and a visual message indicating alarm.

Set Alarms

Are found in the alarms profile key. When settings are adjusted they new setting must then be accepted in order for it to change.

Pressure- (Upper Airway Pressure Alarm)

Infant: 16 – 90 cmH₂O Adult: 16 – 120 cmH₂O

When the upper pressure limit is reached inspiration is discontinued and the expiratory valve opens for exhalation.

Minute Volume-	Upper Alarm Limit	Lower Alarm Limit
Infant	0.06 – 20 L/min	0.06 – 30 L/min
Adult	0.5 – 40 L/min	0.5 – 60 L/min

Respiratory Rate- Low and High Rate setting adjusted between 1 – 160 b/min

End Expiratory Pressure- Should be adjusted a few cmH₂O below your PEEP setting. Can be adjusted between 0- 47 cmH₂O.

Apnea Time- Alarm can be set in SIMV Modes and Support Modes. If activated in the Support Modes the ventilator switches over to Back-Up Ventilation.

Infant: 5 – 15 seconds Adult: 15 – 45 seconds

Autoset (Alarm Limits)- When using any of the Control Modes you can select 'Autoset' to have your alarms adjusted. Limits are set as follows:

High Airway Pressure: Mean Airway Pressure + 10 cmH₂O
Or a minimum of 35 cmH₂O

Minute Volume: +/- 50% of current Minute Volume

Respiratory Rate: +/- 40% of current breath rate

End Expiratory Pressure: -3 cmH₂O of End Expiratory Pressure

*The settings for 'Autoset' make the alarm limits very wide. Just like any other alarm please check and adjust to the most appropriate setting.

Internal Alarms

O₂ Concentration- +/-6% of set O₂

Gas Supply- If one or both supply pressures are insufficient

Battery- Limited Battery Capacity: when only 10 minutes remaining

No Battery Capacity: when < 3 minutes remaining

Technical Errors- If a technical error occurs, a message with the description of the error is displayed. Some technical errors are user errors (eg. Wrong settings for patient type selected). Other errors will require the Ventilator Technician to be called or machine may need to be pulled from service.

Alarm Silence and Reset- Alarms can be silenced or pre-silenced for 2 minutes with a countdown display. After an alarm has been rectified it can be cleared from the screen by pressing the alarm silence key. High priority alarms cannot be silenced (eg. High Pressure Alarm).

Controls and Displays

*Please Note: When making any adjustments using the touch screen keys, the changed data must be accepted by pressing 'Accept' then the machine will make adjustments. If making changes with the easy access dials then the changes are made to the patient without having to accept the change.

Tidal Volume- Adjusted using the touch-screen or the easy access dial. Setting displayed at the bottom of the screen. Patient's actual Inspiratory and Expiratory Volumes are displayed in mLs. Minute Volume is displayed in L/min.

PC above PEEP- Adjusted using the touch-screen or the easy access dial. Setting displayed at the bottom of the screen. In order to decrease setting, PS above PEEP must be set lower than the desired PC above PEEP.

PS above PEEP- Adjusted using the touch-screen. The only display is the settings page.

Respiratory Rate- Adjusted using the touch-screen or the easy access dial. Set rate displayed at bottom of the screen.

PEEP- Adjusted using the touch-screen or the easy access dial. Set PEEP displayed at the bottom of the screen and patient's actual measured PEEP displayed in additional values.

O₂ Concentration- Adjusted using the touch-screen or the easy access dial. Setting displayed at the bottom of the screen. O₂ cell reading displayed in additional values.

Ti- Adjusted using the touch-screen. This controls the Inspiratory Time (Ti) and I:E ratio is also displayed on the same page.

T pause- Adjusted using the touch-screen. The pause occurs during the inspiratory phase therefore as you adjust T pause, your I:E ratio will change.

T inspiratory rise- Adjusted using the touch-screen. The % of the breath cycle time for full flow or pressure to be reached at the start of each breath.

Inspiratory cycle off- Adjusted using the touch-screen. Needs to be adjusted when using Pressure Support or in Volume Support. It is the % of peak maximum flow. When flow has decreased to this value then inspiration will switch over to expiration.

Trigger Sensitivity- Adjusted using the touch-screen. It allows you to set in pressure or flow triggering. A negative value indicates pressure trigger, which requires the patient to produce the set negative value from base line pressure in order to trigger the ventilator. When the setting is in the green section then it is flow triggering. When setting flow trigger, the higher the number value the more sensitive the ventilator will be resulting in less effort required by the patient. Past the green section is the red section, which makes the machine extremely sensitive and likely to 'self cycle'.