

O-Two Self-Study Guide

e700 Transport Ventilator Ventilation Modes



e700 VENTILATION MODES

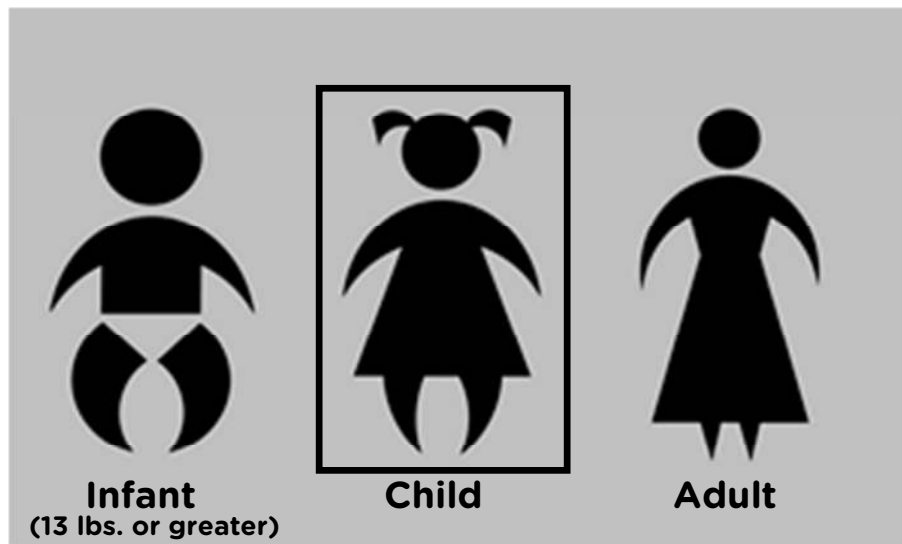
The e700 ventilator has 13 ventilation modes:

Manual Ventilation, Controlled Mandatory Ventilation (CMV), CMV with Pressure Control Ventilation (PCV), Assist Control Ventilation (A/C V), A/C V with PCV, Synchronized Intermittent Mandatory Ventilation (SIMV), SIMV with Pressure Support Ventilation (PSV) (P-SIMV), BiLevel Pressure Ventilation (BiLVL), BiLVL with PSV, CPAP, CPAP with PSV, Mask CPR, intubated CPR. In addition the ventilator provides a “Quick Start” mode when the ventilator is turned on.

Quick Start Mode

The default ventilation mode for “Quick Start” is A/C V.

There are three patient size options on the startup screen:



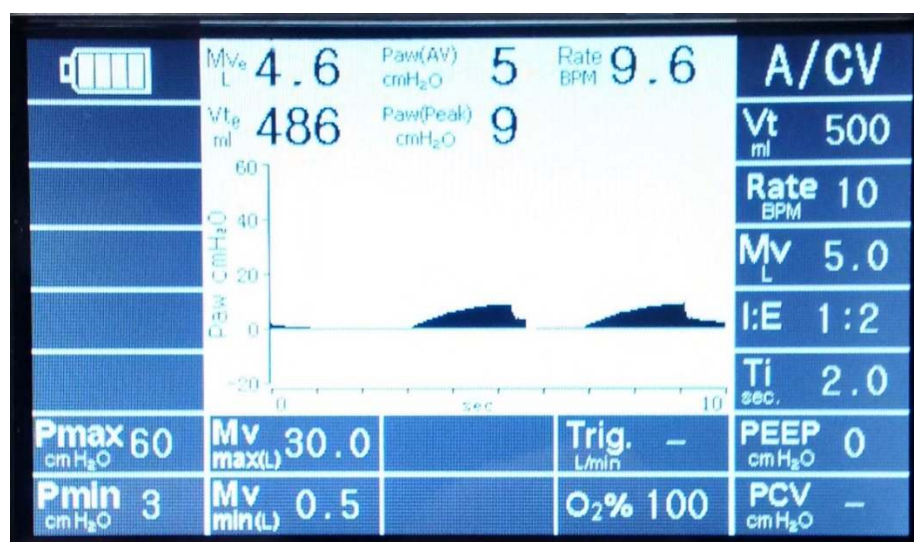
Rotate the control knob to move the cursor over the required patient size select and confirm by pressing the control knob.

Note: If a patient size selection is not made and confirmed within 20 Seconds of start up, the e700 Ventilator will automatically commence ventilation in the Child Mode. Following startup it is easy to make setting changes to ventilation parameters, alarms or to select other ventilation modes.

The pre-set “Quick Start” defaults are based on the American Heart Association Resuscitation Guidelines recommended Tidal Volume/Ventilation Frequencies for the patient sizes indicated.

1. Assist/Control Volume Ventilation (A/C V)

Assist Control Ventilation (A/C V) – Ventilator will deliver Mechanical Ventilation at the set Tidal Volume (Vt) and Rate (BPM). If the patient makes a spontaneous effort and initiates the start of the ventilation cycle the ventilations then become Patient Triggered however, the Ventilator will maintain the selected ventilation parameters.

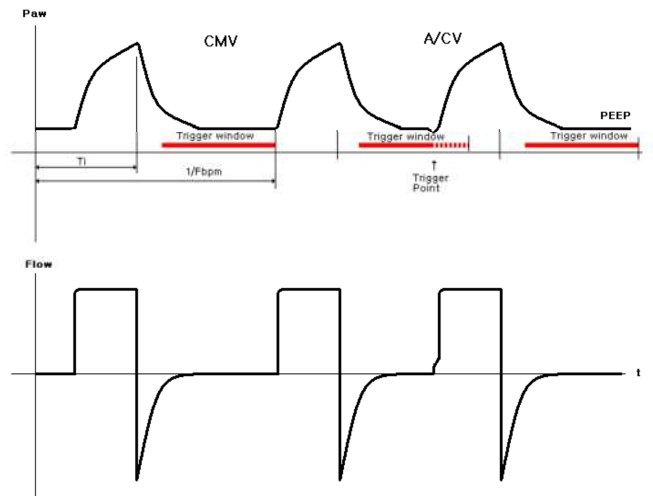


Screen display for A/C V mode

A/C V Ranges and the Default “Quick Start” settings for Infant, Child and Adult.

-----DEFAULT-----

A/C V Settings	Ranges	Infant	Child	Adult
Vt (Tidal Volume)	50 – 2000 ml	100	250	500
Rate BPM	5 – 60 BPM	30	15	10
Vm. (L) Minute Volume	Calculated and displayed based on Tidal volume and Rate (Breaths per minute)	3.0	3.7	5.0
I:E Ratio (Inspiratory: Expiratory ratio)	1:4 – 3:1	1:2	1:2	1:2
Ti* (Inspiratory time)	0.2 – 9 seconds	0.66	1.33	2.0
PEEP (cm H ₂ O) (Positive End Expiratory Pressure)	OFF, 4- 20 cm H ₂ O	5.0	5.0	5.0
PCV (Pressure Control Ventilation)	Off, 4 – 50 cm H ₂ O	Off	Off	Off
Trig. (Trigger)	Off, 1 -15 Liters / min.	3.0	3.0	3.0
O ₂ %	100% or 60% Oxygen	100	100	100
Alarm Limits				
Mv Max (Minute Volume Maximum)	2 – 40 Liters	30	30	30
MV Min (Minute Volume Minimum)	0.5 – 35 Liters	0.5	0.5	0.5
P max (Pressure Maximum - cm H ₂ O)	10 – 80 cm H ₂ O	25	25	30
P min (Pressure Minimum - cm H ₂ O)	0 – 20 cm H ₂ O (During Inspiratory time only)	3	3	3

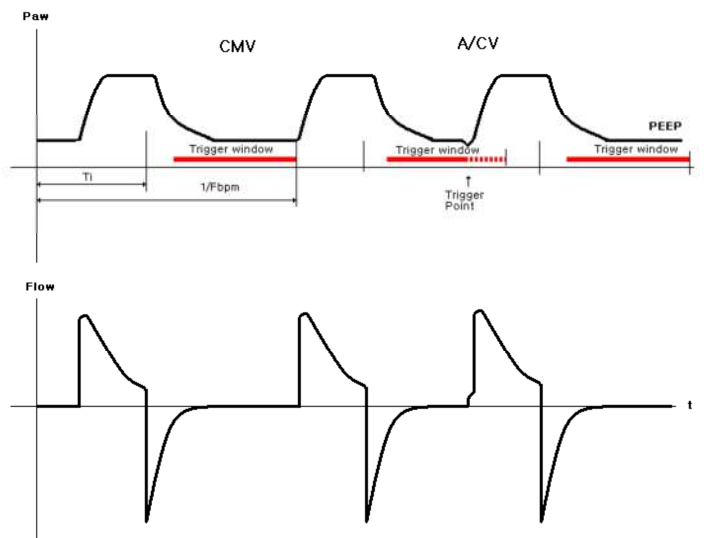


Assist/Control Volume (A/C V) Waveform

2. Assist/Control Pressure Ventilation (A/C P)

In the pressure Controlled Ventilation (PCV) setting the ventilator generates the preset pressure during a preset inspiratory time and at a preset ventilation rate (as selected by the operator). There is no Tidal Volume selection in the PCV mode. The pressure is constant during the inspiratory time and the flow is decelerating.

Assist/Control Pressure (A/C P) Waveform



Note: Selecting Pressure Control setting voids Volume setting / Selecting Volume Control settings voids Pressure Control Setting

NOTE: Refer to the product manual for further definitions and descriptions of function.

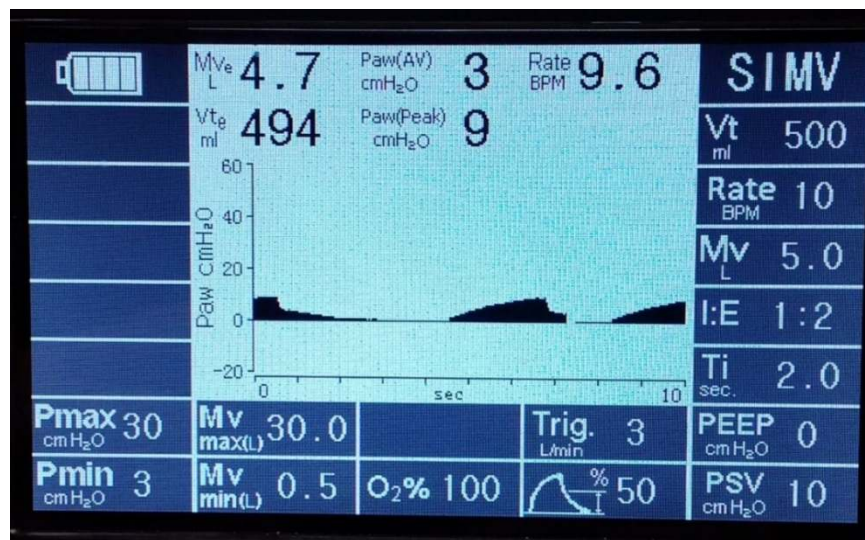
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3. Controlled Mandatory Ventilation (CMV)

In the A/C V mode if the Trigger (Trig) is turned off (“-“) the ventilator will deliver mandatory ventilation regardless of the patient’s inspiratory effort.

4. Synchronized Intermittent Mandatory Ventilation - (SIMV)

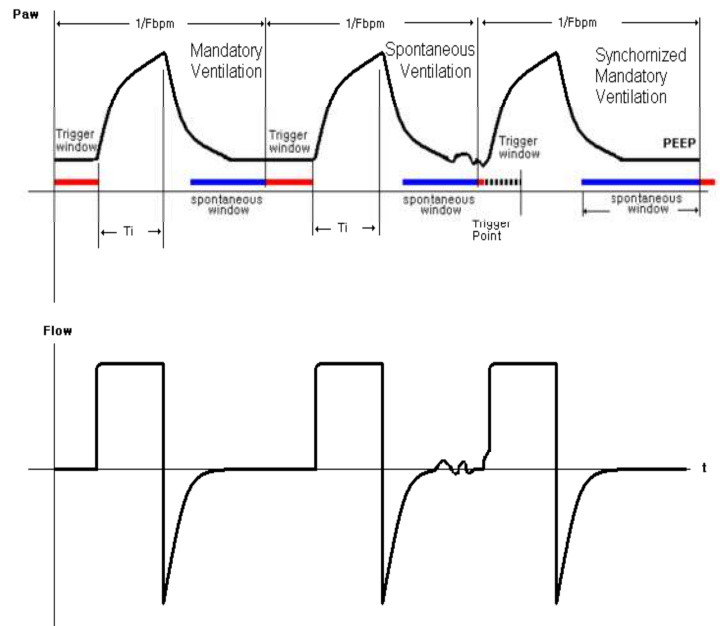
The SIMV mode allows the patient to breath spontaneously. If assistance is needed the vent will assist. If NO patient effort during trigger window - Ventilator will initiate Mandatory Ventilation.



Screen display for SIMV mode

Range and Ventilation Settings for SIMV.

Parameter	Range
Tidal Volume (Vt)	50 - 2000ml
Rate	5 - 60 BPM
Mv	(Ventilator Calculated based on Vt. & frequency)
I:E Ratio	1:4 - 3:1
Ti	0.2 - 9 seconds
PEEP	OFF, 4 -20 cm H ₂ O
PSV	OFF, 4-35 cm H ₂ O
Trig.	OFF, 1 - 15 Liters per minute
Termination	20-80% of maximum set flow
O ₂ %	100% or 60%
Alarm Limits	
Mv max	2 - 40 Liters
Mv Min	0.5 - 35 Liters
P max	10 - 80 cm H ₂ O
P min	0-20 cm H ₂ O (During Inspiratory time only)

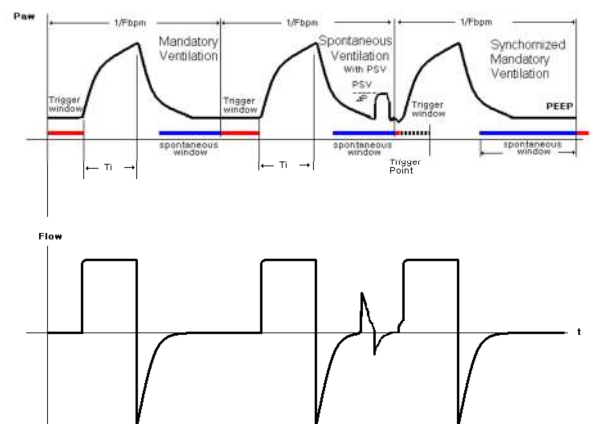


SIMV Waveform with NO Pressure Support

5. SIMV with Pressure Support Ventilation (P-SIMV)

Pressure Support Ventilation (PSV) is a spontaneous mode of ventilation where the patient initiates every breath and the ventilator delivers inspiratory support to the selected pressure value.

In the P-SIMV mode the ventilator will assist the spontaneously ventilated patient with pressure cycled breaths at their own respiratory rate and tidal volume.



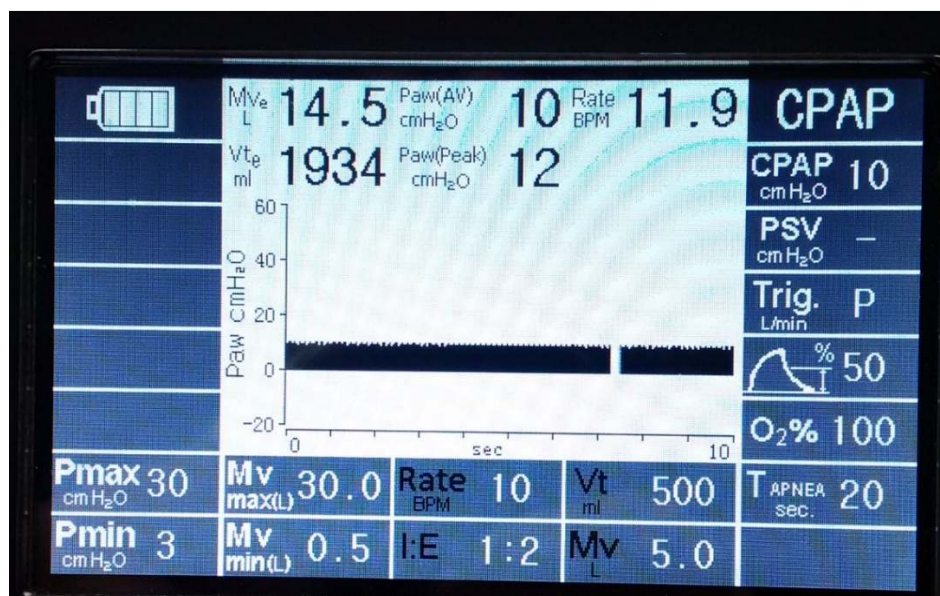
SIMV Waveform with Pressure Support

6. Constant Positive Airway Pressure (CPAP)

In CPAP mode, the ventilator will deliver a continuous flow rate to generate a continuous positive pressure in the airway. The ventilator uses the control valve to maintain the CPAP level.

Range and Default Ventilation Setting - CPAP and CPAP with Pressure Support Ventilation (PSV)

----- DEFAULT -----				
Parameter	Range	Infant	Child	Adult
CPAP	4 - 20 cm H ₂ O	5	5	5
PSV	Off, 4 - 35 cm H ₂ O (Operator controlled)	OFF	OFF	OFF
Trigger	P or 1-15 liters / min. (P= 2 cm H ₂ O below base line)	P	P	P
Termination	(20 - 80% of maximum flow)	50%	50%	50%
O ₂ %	100% or 60%	100%	100%	100%
T Apnea	10 - 60 seconds	20	20	20
Vt (APNEA Back up)	50 - 2000 ml	100	250	500
Rate (APNEA Back up)	5 -60 BPM	30	15	10
MV (APNEA Back up)	Will be calculated on based on Vt (Tidal Volume) and Respiratory Rate	3.0	3.7	5.0
I:E ratio (APNEA Back up)	1:4 - 3:1	1:2	1:2	1:2
Alarm Levels				
Mv max	2 - 40 Liters	30	30	30
Mv min	0.5 - 35 Liters	0.5	0.5	0.5
P max	10 - 80 cm H ₂ O	25	25	30
P min	0 - 20 cm H ₂ O during Inspiratory time only	3	3	3



Screen display for CPAP mode

NOTE: Refer to the product manual for further definitions and descriptions of function.

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Note: CPAP is pre-set with 20 second APNEA backup - settings for Rate BPM, Tidal Volume (Vt), I:E ratio, and Minute Volume (Mv) location is set at the bottom of the screen. The default settings can be adjusted by the operator.

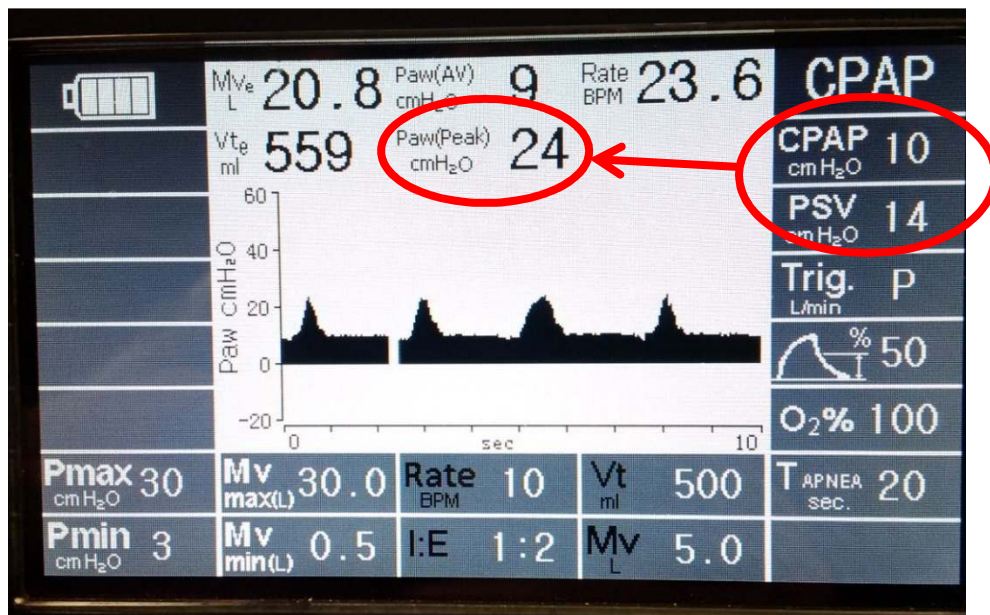
7. CPAP with Pressure Support Ventilation (CPAP +PSV)

CPAP + PSV is equivalent to BiPAP and provides positive airway pressure through both the inspiratory and expiratory phases of the breathing cycle but at two different levels. This reduces the work of breathing for the patient as the lower expiratory pressure allows for easier exhalation while the higher inspiratory pressure assists in inhalation.

CPAP + PSV is equivalent in effect to BiPAP.

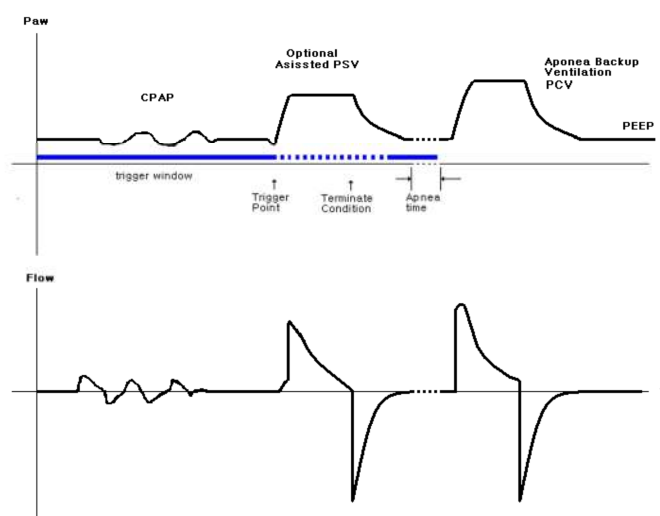
To create BiPAP with the e700 ventilator we utilize the CPAP setting to generate the lower, expiratory, pressure and the Pressure Support Ventilation setting to generate the higher, inspiratory pressure.

The peak inspiratory pressure is the CPAP pressure + the PSV pressure e.g.: 5 cm H₂O of CPAP + 10 cm H₂O of PSV = a 15cm H₂O peak inspiratory pressure.



Screen display for CPAP+PSV mode

Note: CPAP is pre-set with 20 second APNEA backup - settings for Rate BPM, Tidal Volume (Vt), I:E ratio, and Minute Volume (Mv) location is set at the bottom of the screen. The default settings can be adjusted by the operator.



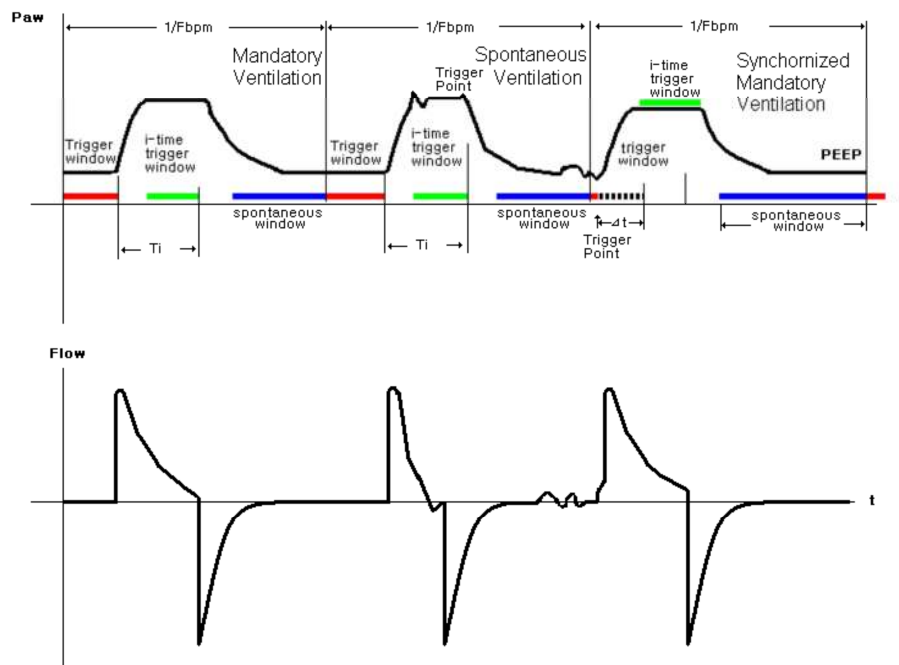
CPAP / CPAP PSV Waveform

8. Biphasic Pressure Ventilation (BiLVL)

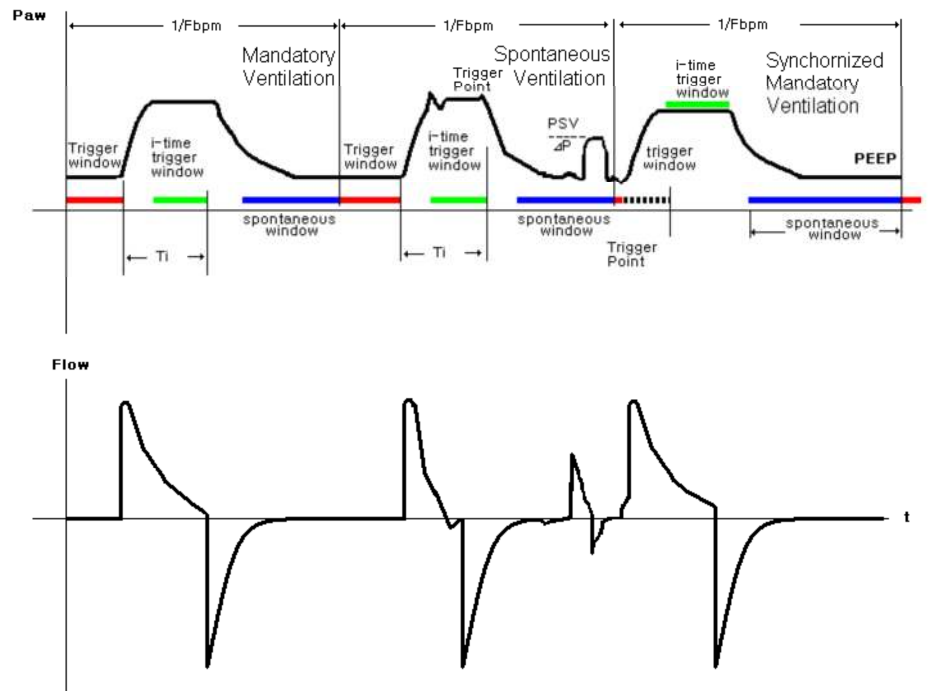
Note: Biphasic is **NOT BiPAP** - it is similar to SIMV with pressure control (P-SIMV) and optional Pressure Support Ventilation.

-----DEFAULT-----

Parameter	Range	Infant	Child	Adult
Pi (Inspiratory Pressure)	Off, 4-50 cm H ₂ O	15	15	15
Rate BPM	5 - 60 BPM	30	15	10
PEEP	Off, 4 -20 cm H ₂ O	5	5	5
I:E ratio	1:4 - 3:1	1:2	1:2	1:2
Ti (Inspiratory Time)	0.2 - 9 seconds	1.0	1.33	2.0
PSV (Pressure Support Ventilation)	Off, 4 - 35 cm H ₂ O	Off	Off	Off
Trig. (Trigger)	1 - 15 Liters / minute	3	3	3
Termination	20 - 80% of maximum set flow	50%	50%	50%
O ₂ %	100% or 60% Oxygen	100	100	100
Alarm Levels				
Mv max (Minute Volume Maximum)	2 - 40 Liters	30	30	30
Mv min (Minute Volume Minimum)	0.5 - 35 Liters	0.5	0.5	0.5
P max (Pressure Maximum)	10 - 80 cm H ₂ O	25	25	30
P min (Pressure Minimum)	0 - 20 cm H ₂ O (during I time only)	3	3	3



BiLVL Waveform without Pressure Support



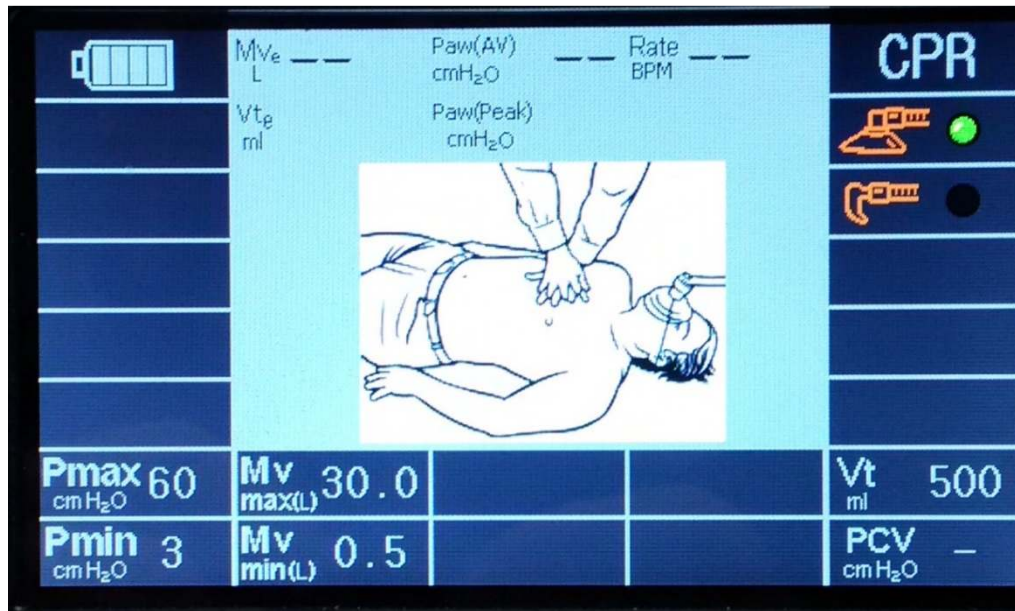
BLVL Waveform with Pressure Support

9. CPR Modes

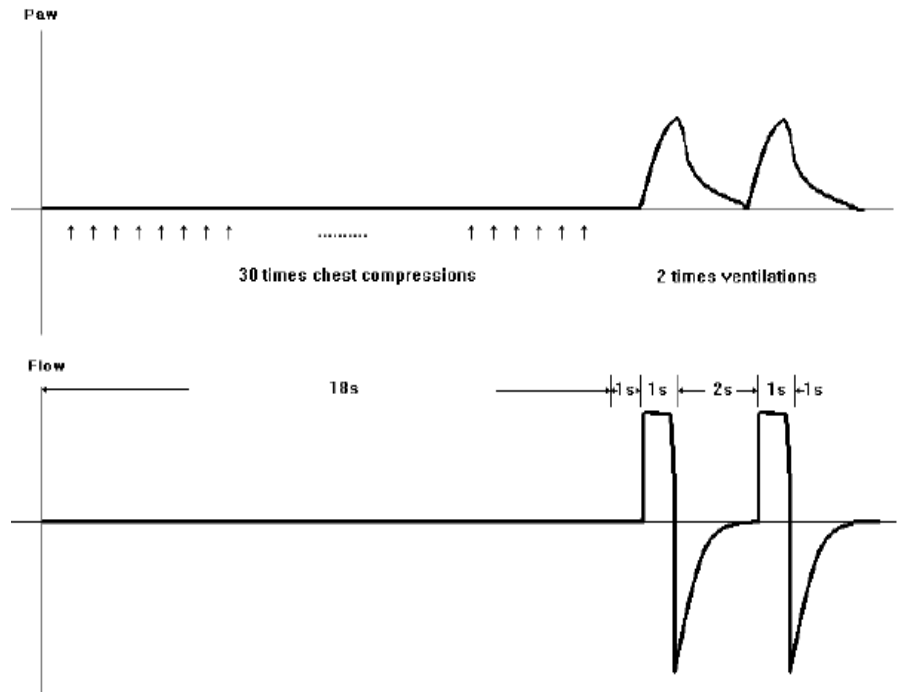
The CPR Mode consists of timed chest compression audible prompts coupled with automatically delivered breaths for both intubated and mask ventilated patients. The screen displays a visual animated display to guide the health care provider while performing CPR. Oxygen is delivered automatically at 100%.

----- DEFAULT -----				
Parameter	Range	Infant	Child	Adult
Ti (Tidal Volume)	50 - 1400 ml	100	250	500
PCV (Pressure Controlled Ventilation)	Off, 4 - 50 cm H ₂ O	Off	Off	Off
Alarm Levels				
Mv Max (Minute Volume Maximum)	2 - 40 Liters	30	30	30
Mv Min (Minute Volume Minimum)	0.5 - 35 Liters	0.5	0.5	0.5
P Max (Pressure Maximum)	10 - 80 cm H ₂ O	40	40	60
P Min (Pressure Minimum)	0 - 20 cm H ₂ O during I time only	3	3	3

Mask Ventilated Patient Basic Airway - 30:2

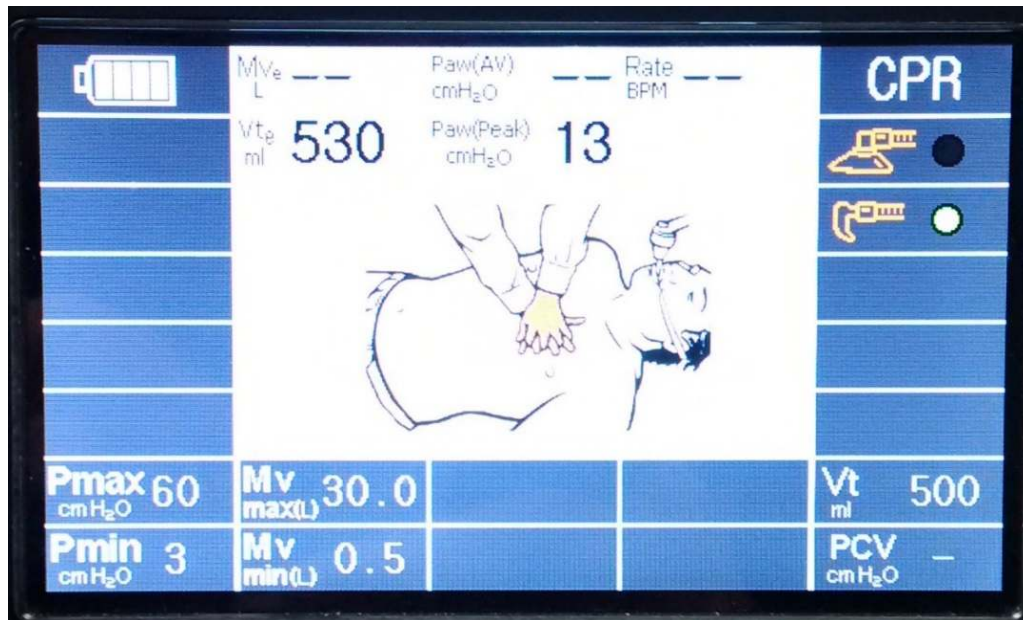


With each chest compressions hands are highlighted;
the mask highlights in blue when a breath is delivered.

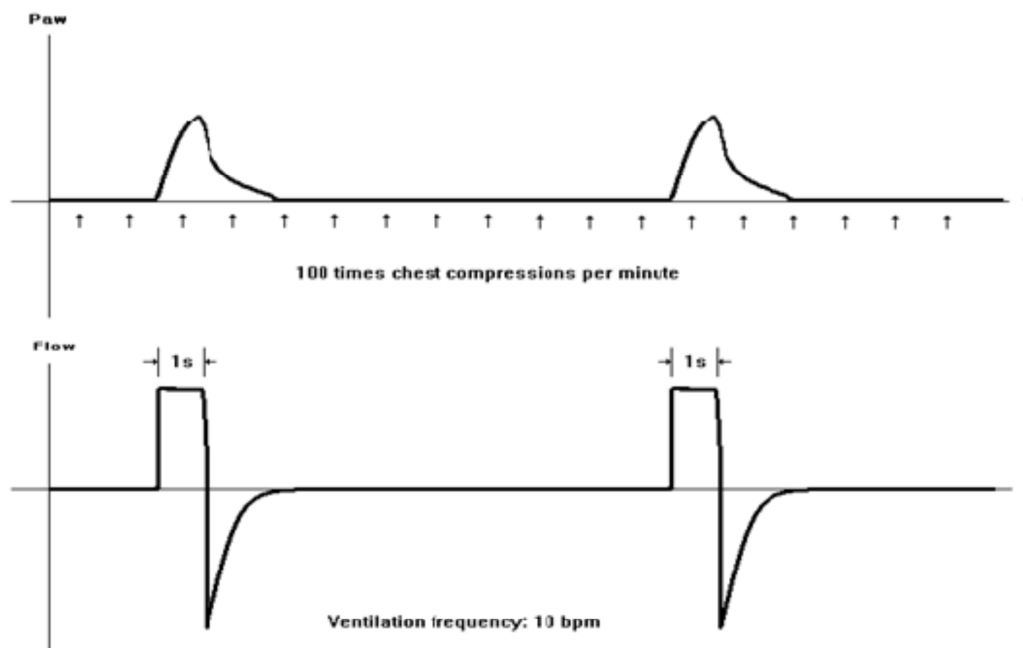


Mask CPR Ventilation Waveforms

Intubated Airway Ventilation Advanced Airway - Asynchronous



With each chest compression the hands are highlighted; the ET tube highlights in blue when a breath is delivered



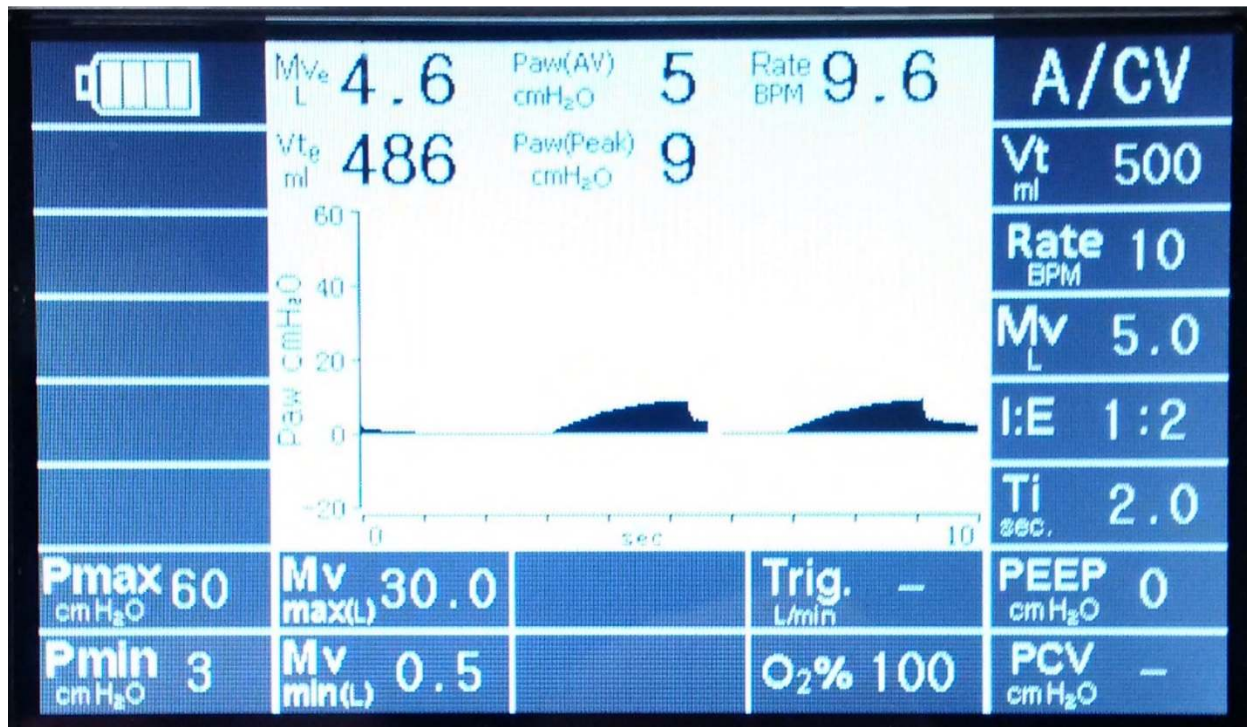
Intubated CPR Ventilation Waveforms

Use of a Chest Compression Device or CPR with no Pictogram or Sound

Note: When using a chest compression device with the e700, the set CPR modes with pictogram and sound will be difficult to synchronize with the device.

To use a chest compression device simply....

- Set the e700 to A/C V mode
 - Turn off the PEEP
 - Turn off the Trigger
 - Set Pressure Max (Pmax) at 60 cm H₂O
1. Appropriate size of patient is already selected – pre-set default in A/CV start up mode -or operator can select the proper preferred Tidal Volume and Rate
 2. Operator has the option to adjust other parameters based on local protocol.



A/C V settings with Trigger turned off, “0” PEEP and
Pmax set to 60 cm H₂O.

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