

SELF-STUDY GUIDE



e700 Transport Ventilator Ventilation Modes

E700 Ventilation Modes

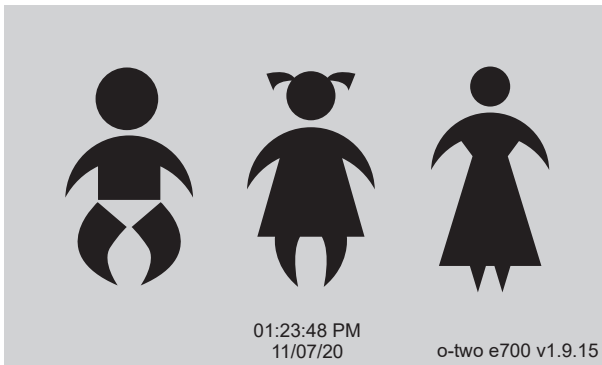
The e700 ventilator is equipped with a number of ventilation modes to enable the healthcare provider to tailor the ventilator settings to the patient's specific respiratory requirements. Ventilation could be delivered invasively (ET tube) or non-invasively (mask).

In all modes, should the patient demand more flow than set by Health care provider, he/she can inhale the required volume from ambient.

Each ventilation mode has a default setting (based on the initial patient size setting selection on startup) which will be initiated on selection of that specific ventilation mode if no changes to the settings are made.

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.

Assist/Control Volume Ventilation (A/C V)


In this mode the ventilator can deliver either volume ventilation (VCV) if Tidal Volume (Vt) is selected (Figure 10.a) or pressure ventilation (Figure 10.b) if Pressure Controlled Ventilation (PCV) is selected. Choosing either mode will disable the other one which will be displayed with (-) on the screen.

Volume control ventilation (VCV) with Tidal Volume and ventilation Rate setting according to patient size is the default start up for this mode (see Table-2 below).

During A/C V mode, the ventilator will deliver Controlled Mandatory Ventilation (CMV) regardless of any patient's effort if the trigger (Trig.) is disabled (displayed with (-)).

The default trigger for A/C V is 3 L/min but can be adjusted up to 15 L/min.

If no inspiratory effort is detected during the trigger window, the ventilator will initiate mandatory ventilation at the end of trigger window. Should the patient demand more flow than set by user, he/she can withdraw the excess from ambient.

				A/C V					
				Vt ml	250				
				Rate bpm	15				
				Mv L	3.7				
				I:E	1:2				
				Ti sec.	1.33				
Pmax cm H ₂ O	25	Mv max(L)	30	O ₂ %	100	PCV cm H ₂ O	-	PEEP cm H ₂ O	5
Pmin cm H ₂ O	3	Mv min(L)	0.5			TRise sec.	-	Trigger L/min	3

Screen display for A/C V mode

TABLE 2 - Default Ventilation Setting- A/C V

PARAMETER	RANGE	DEFAULT		
		INFANT	CHILD	ADULT
Tidal Volume	(50 - 2000 ml)	100	250	500
Rate	(5 - 60 BPM)	30	15	10
Mv	Calculated based on Vt & f	3.0	3.7	5.0
I:E ratio	(1:4 - 3:1)	1:2	1:2	1:2
Ti*	(0.2 - 9 sec.)	0.66	1.33	2.0
PEEP	(OFF, 4-20 cm H ₂ O)	5	5	5
PCV	(OFF, 4-50 cm H ₂ O)	Off, unless selected	Off, unless selected	Off, unless selected
Trig.	(OFF, 1 -15 L/min)	3	3	3
O₂ %	(100% or 60% O ₂)	100	100	100
Mv max	(2 -40 L)	30	30	30
Mv min	(0.5 - 35 L)	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 I time only)	3	3	3
Manual	Refer to Manual and I-Hold section	ready	ready	ready

* Ti may be limited below its range depending on set I:E ratio and rate.

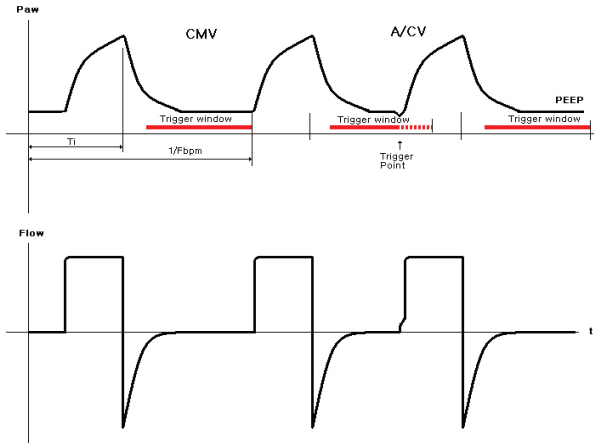


Figure 10.a - A/C V waveform with volume control

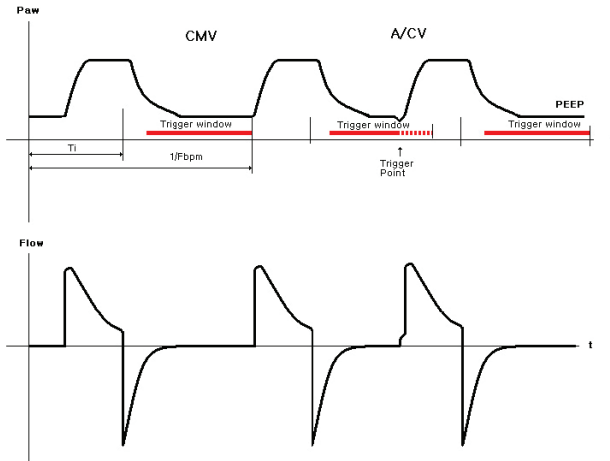


Figure 10.b - A/C V waveform with pressure control

SIMV (Synchronized Intermittent Mandatory Ventilation)

In this mode the ventilator will deliver volume ventilation at the set Tidal Volume (Vt) and Rate (bpm)

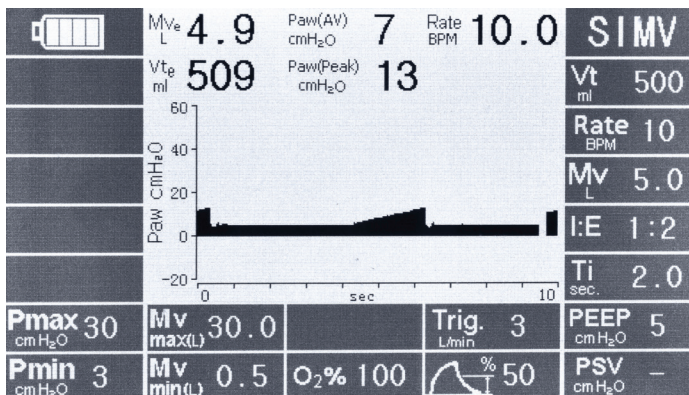
The default trigger for this mode is 3 L/min but can be adjusted up to 15 L/min. if trigger condition is met, the ventilator will deliver synchronized volume controlled mandatory ventilation.

In SIMV mode the selected breathing rate remains constant and the time of spontaneous breathing window will change if patient triggers the synchronized mandatory breath before the normal start of inhalation phase (beginning of Ti).

If no effort was detected during the trigger period, the ventilator will initiate mandatory ventilation at the end of trigger window. Should the patient demand more flow than set by user, he/she can withdraw the excess from ambient.

PSV (Pressure Support Ventilation - Figure 11.b)

PSV is a form of assisted ventilation for the patient who is breathing spontaneously but whose respirations are insufficient. The ventilator provides an inspiratory flow based on the patient's inspiratory effort. Ventilator sensitivity to the patient's inspiratory effort is operator adjusted by using the "Trig." Control and the inspiratory flow rate is tailored to the patient's demand by the ventilator.



Screen display for SIMV mode

TABLE 3 - Default Ventilation Setting- SIMV

PARAMETER	RANGE	DEFAULT		
		INFANT	CHILD	ADULT
Tidal Volume	(50 - 2000 ml)	100	250	500
Rate	(5 - 60 bpm)	30	15	10
Mv	Calculated based on Vt & f	3.0	3.7	5.0
I:E ratio	(1:4 - 3:1)	1:2	1:2	1:2
Ti*	(0.2 - 9 sec)	0.66	1.33	2.0
PEEP	(OFF, 4-20 cmH ₂ O)	5	5	5
PSV	(OFF, 4-35 cmH ₂ O)	Off, unless selected	Off, unless selected	Off, unless selected
Trig.	(1 -15 L/min)	3	3	3
Termination	20-80% of maximum set flow	50%	50%	50%
O₂ %	(100% or 60%)	100	100	100
Mv max	(2 -40 L)	30	30	30
Mv min	(0.5 - 35 L)	0.5	0.5	0.5
P max.	10 -80 cmH ₂ O	25	25	30
P min.	0-20 cmH ₂ O (during I time only)	3	3	3
Manual	Refer to Manual and I-Hold section	ready	ready	ready

* Ti may be limited below its range depending on set I:E ratio and rate.

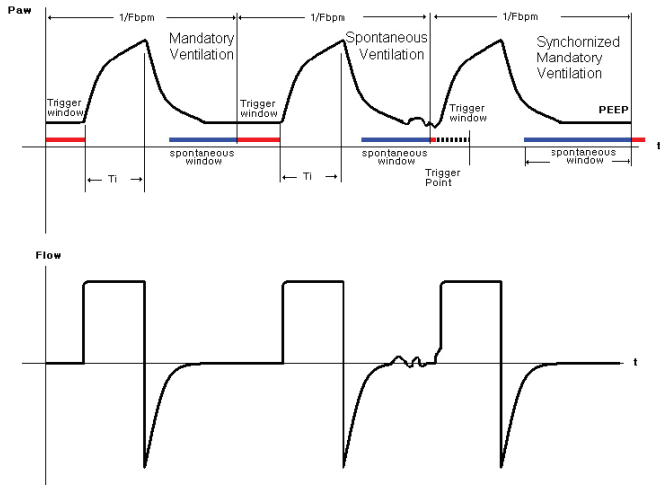


Figure 11.a - SIMV waveform w/o pressure support

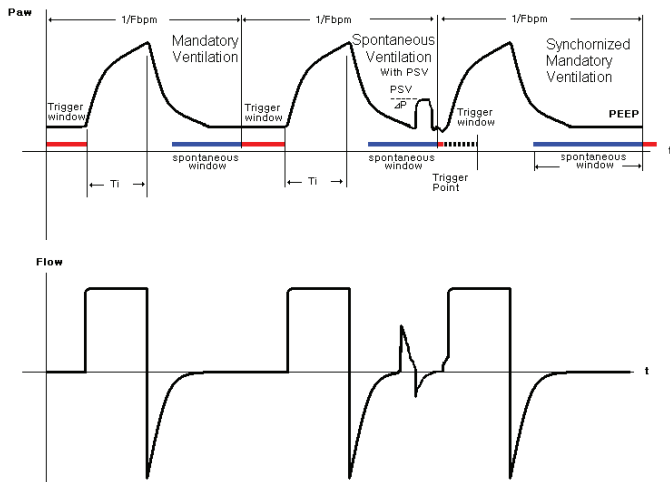


Figure 11.b - SIMV waveform with pressure support

BiLVL (Biphasic Positive Airway Pressure)

BiLVL mode is similar to SIMV but comes with pressure ventilation. By setting both inhalation pressure (Pi) and exhalation pressure (PEEP) levels, the ventilator will deliver pressure controlled mandatory breaths at set rates (bpm). The default trigger for spontaneous breathing window is 3 L/min but can be adjusted up to 15 L/min.

Similar to SIMV, in BiLVL mode the selected breathing rate remains constant and the time of spontaneous breathing window will change instead if patient triggered the synchronized mandatory ventilation before the normal start of the inhalation phase (beginning of Ti).

If no effort is detected during the trigger period, the ventilator will initiate mandatory ventilation at the end of trigger window. Should the patient demand more flow than set by user, he/she can withdraw the excess from ambient.

PSV (Pressure Support Ventilation- Figure 12.b)

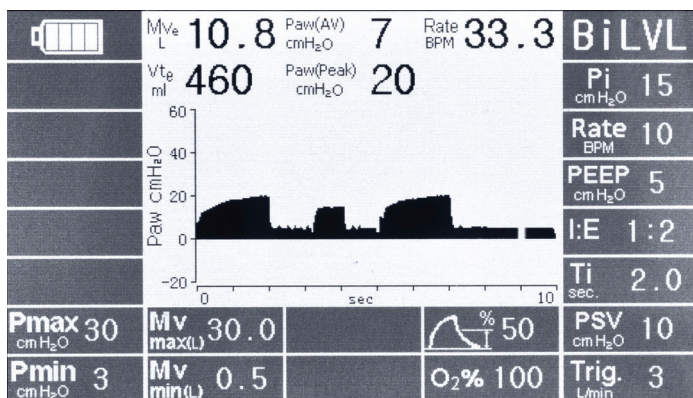
PSV is a form of assisted ventilation for the patient who is breathing spontaneously but whose respirations are insufficient. The ventilator provides an inspiratory flow based on the patient's inspiratory effort. Ventilator sensitivity to the patient's inspiratory effort is operator adjusted by using the "Trig." Control and the inspiratory flow rate is tailored to the patient's demand by the ventilator.

Note: When calculating the peak/plateau pressure add the Pressure Support level to the set PEEP level.

TABLE 4 - Default Ventilation Setting- BiLVL

PARAMETER	RANGE	DEFAULT		
		INFANT	CHILD	ADULT
Pi	(OFF, 4-50 cm H ₂ O)	15	15	15
Rate	(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*	(0.2 - 9 sec)	0.66	1.33	2.0
PSV	(OFF, 4-35 cm H ₂ O)	Off, unless selected	Off, unless selected	Off, unless selected
Trig.	(1 -15 L/min)	3	3	3
Termination	20-80% of maximum set flow	50%	50%	50%
O₂ %	(100% or 60% O ₂)	100	100	100
Mv max	(2 -40 L)	30	30	30
Mv min	(0.5 - 35 L)	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 I time only)	3	3	3
Manual	Refer to Manual and I-Hold section	ready	ready	ready

* Ti may be limited below its range depending on set I:E ratio and rate.



Screen display for BiLVL mode

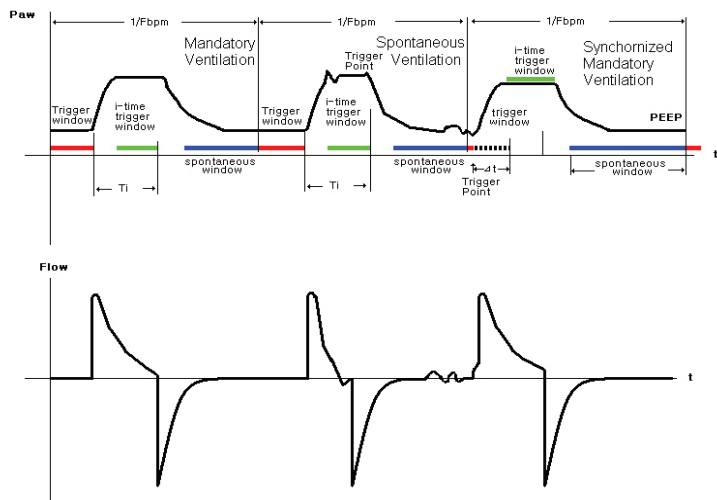


Figure 12.a - BiLVL waveform w/o pressure support

CPAP (Continuous Positive Airway Pressure)

In CPAP mode, the ventilator will deliver a continuous flow rate to generate airway pressure and use the control valve to maintain CPAP levels (Figure 13).

There are 2 breathing modes available for the patient during CPAP. The first mode is with spontaneous breathing when the optional pressure support is set to “-”. In this option the ventilator adjusts the amount of flow internally to maintain average airway pressure close to CPAP setting.

The other mode is when the optional PSV (Pressure Support) is set to a desired value. The ventilator will deliver the set PSV pressure starting at triggering point and until the exhalation phase starts.

Note: The default trigger in CPAP mode is pressure trigger (P) which is set at 2 cm H₂O below CPAP settings.

The CPAP mode is equipped with APNEA back up ventilation in which the ventilator switches to Assist Control ventilation (A/C V) when the ventilator does not trigger patient's spontaneous breathing for a period of time (T APNEA) set by the user. The parameters of back up A/C ventilation are defaulted to volume ventilation based on the initial start up patient size selection unless changes are made by the user.

The trigger changes from pressure trigger (P) to 3 L/min default flow trigger when the ventilator switches to APNEA back up.

PSV (Pressure Support Ventilation)

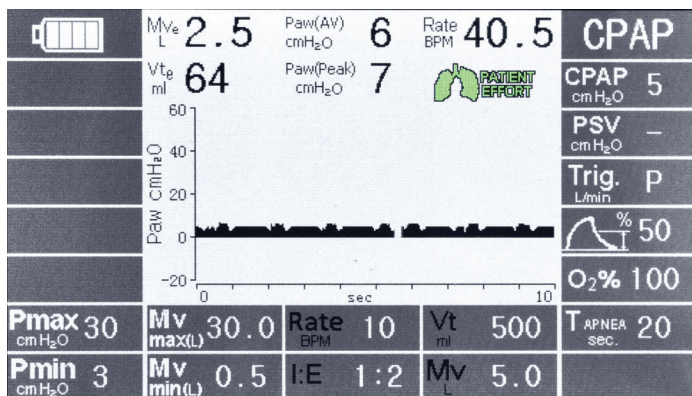
PSV is a form of assisted ventilation for the patient who is breathing spontaneously but whose respirations are insufficient. The ventilator provides an inspiratory flow based on the patient's inspiratory effort. Ventilator sensitivity to the patient's inspiratory effort is operator adjusted by using the “Trig.” Control and the inspiratory flow rate is tailored to the patient's demand by the ventilator.

Note: When calculating the peak/plateau pressure add the Pressure Support level to the set PEEP level.

TABLE 5 - Default Ventilation Setting- CPAP

PARAMETER	RANGE	DEFAULT		
		INFANT	CHILD	ADULT
CPAP	(4-20 cmH ₂ O)	5	5	5
PSV	(OFF, 4-35 cmH ₂ O)	OFF	OFF	OFF
Trig.	(P or 1 -15 L/min) P = 2 cmH ₂ O below base line	P	P	P
Termination	(20 – 80 % of maximum set flow) or 2 cmH ₂ O below baseline in CPAP mode only	50 %	50%	50%
O₂ %	(100% or 60%)	100%	100%	100%
T APNEA	(10-60 seconds)	20	20	20
Vt(A)	(50 - 2000 ml)	100	250	500
Rate (A)	(5 - 60 BPM)	30	15	10
Mv (A)	Will be calculated based on Vt & f	3.0	3.7	5.0
I:E ratio (A)	(1:4 – 3:1)	1:2	1:2	1:2
Mv max	(2 -40 L)	30	30	30
Mv min	(0.5 – 35 L)	0.5	0.5	0.5
P max.	10 -80 cmH ₂ O	25	25	30
P min.	0-20 cmH ₂ O during I time only	3	3	3

NOTE: Refer to the product manual for further definitions and descriptions of function. Rev 1. MAR2021



Screen display for CPAP mode

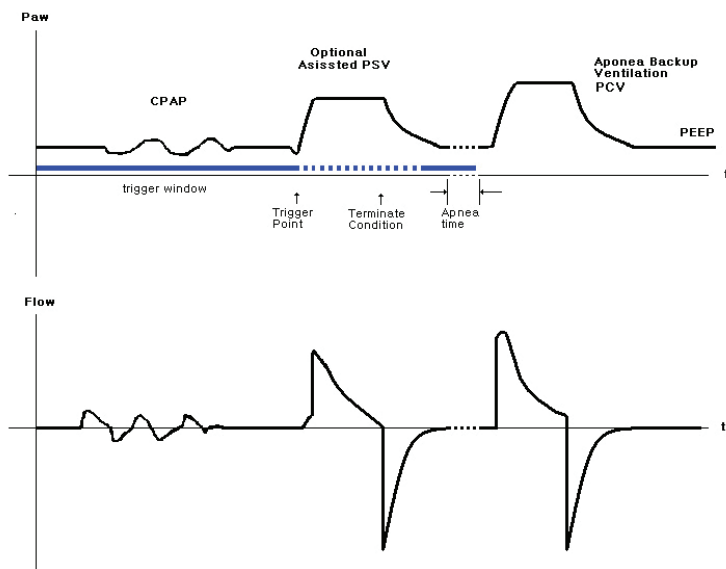


Figure 13 - CPAP ventilation waveform

CPR mode

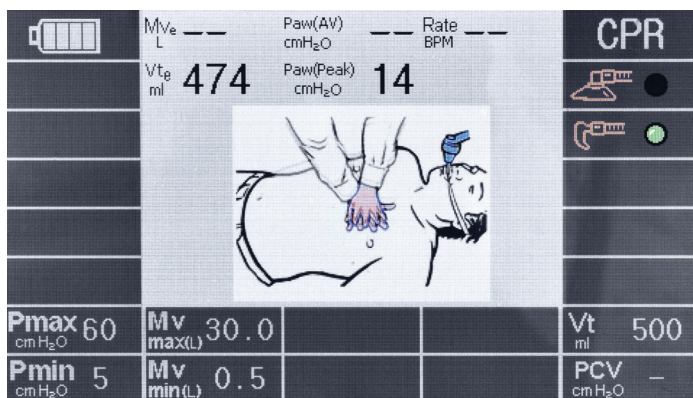
The CPR mode consists of timed chest compression audible prompts coupled with automatically delivered breaths for both intubated and mask ventilated patients. There is also a visual animated display to guide the health care provider while performing CPR.

The CPR mode for masked ventilated patients is the default setting for this mode but changes can be made between the 2 sub-modes at any time.

The CPR mode for masked ventilated patients consists of 2 phases, chest compression and ventilation. 30 chest compressions over 18 seconds are synchronized with audible prompts and on screen visual animations, followed by two, 1 second, mandatory breaths within a 5 second ventilation phase. The ratio between chest compressions and ventilations is 30:2.

The CPR mode for intubated patients consists of continuous compressions indicated by an audible prompt and visual animation at a rate of 100 compressions per minute plus automatically delivered breath every 6 seconds (10 BPM).

The default ventilation in CPR mode is flow controlled ventilation. The default tidal volume is set according to the initial start-up patient size selection when switching to CPR mode but could be adjusted to desired values. Optional pressure controlled ventilation is provided by setting the PCV pressure parameter. If PCV parameter is selected, the flow controlled ventilation will be disabled. The FiO_2 is fixed at 100% oxygen during CPR mode.



Screen display for CPR mode

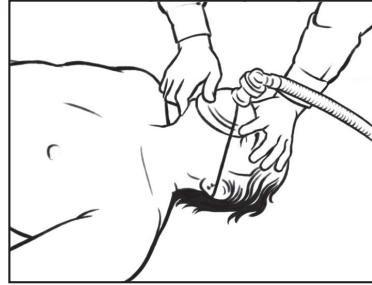
TABLE 6 - Default Ventilation Setting- CPR

PARAMETER	RANGE	DEFAULT		
		INFANT	CHILD	ADULT
Tidal Volume	(50 - 1400 ml)	100	250	500
PCV	(OFF, 4-50 cmH ₂ O)	OFF	OFF	OFF
Mv max	(2 -40 L)	30	30	30
Mv min	(0.5 - 35 L)	0.5	0.5	0.5
P max.	(10 -80 cmH ₂ O)	40	40	60
P min.	(0-20 cmH ₂ O during I time only)	3	3	3

CPR FOR MASKED PATIENTS



On screen chest compressing animation



On screen ventilation animation

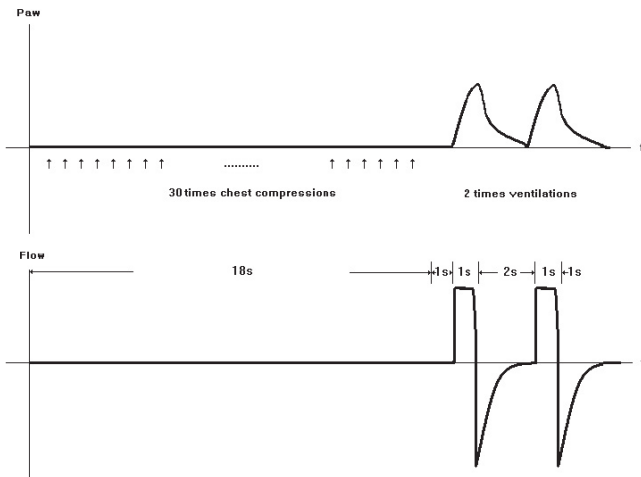
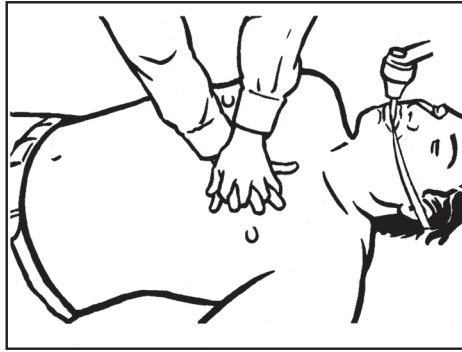


Figure 14.a - CPR waveform for masked patient



On screen intubated CPR animation

CPR FOR MASKED PATIENTS

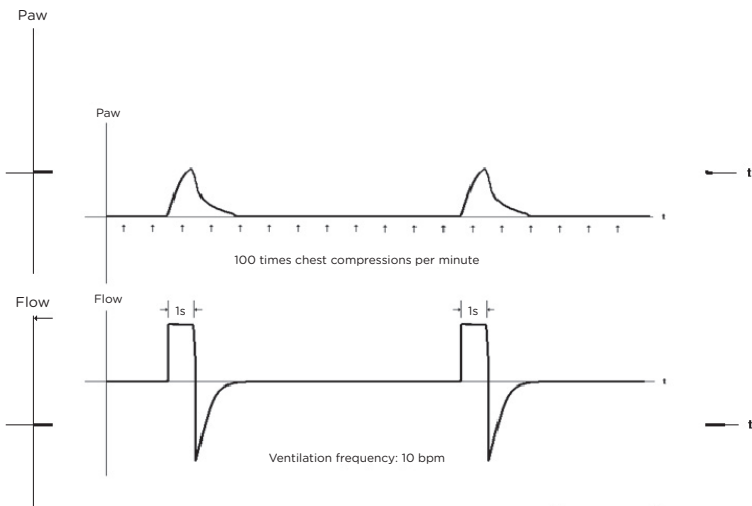


Figure 14.b - CPR waveform for intubated patient

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.

Your Representative is:



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