initial settings for **HAMILTON-TI** ventilator

SIMV+

(Pressure Regulated Volume Control)

Adult/Ped

Male or Female

sets Vt at 6ml/kg IBW

Pat. height

sets Vt at 6ml/kg IBW

all other patients get **VC-Standard**

VC-Obstructive for **asthma/COPD**

Start Ventilation

Rate

16 bpm - titrate to normal CO_2/pH

10 bpm - titrate to fastest **Rate** on flow/time graph that avoids breath-stacking. Permissive hypercapnoea (pH>7.15)∴ sedate ++

PEEP/ CPAP

5 *(preset)* -titrate using PEEP/O_2 scale

5	5	8	8	10	10	10	12	14	14	14	16	18	18	20	22	24
30	40	40	50	50	60	70	70	70	80	90	90	90	100	100	100	100

to SpO_2 of 92-95%

0 *(preset)*

Oxygen

100% *(default)*- titrate to SpO_2 of 86-92%

controls TI

I:E = 1:2 *(preset)*

(re-titrate TI with every Rate change to get I:E)

I:E ≥ 1:4 *(preset)*

(re-titrate TI with every Rate change to get I:E)

SIMV+ troubleshooting for HAMILTON-TI ventilator

If **Vt low** and **Pressure limitation** alarms, press **Monitoring 3**

R_{insp} < 15 (rr<15)
C_{stat} <<50 (rr>50)
= *Stiff lungs*

Seek & Treat
-chest causes (eg: pneumothorax)
- abdominal causes (eg: obesity, ascites)

↓ **VTe** (min 4ml/kg IBW)
↑ **Rate** to maintain MinVol

R_{insp} >>15 (rr<15)
C_{stat} > 50 (rr>50)
= *Obstructed lungs*

Seek & Treat
-blocked tube
-bronchospasm

↑ **Pressure limitation** in increments of 10 to allow VTe (max 70)
↓ **Rate** in increments of 2 (min 4 or pH≤7.1)
↑ **I:E ratio** ≥1:4

R_{insp} >>15 (rr<15)
C_{stat} <<50 (rr>50)
= *Obstructed lungs + gas trapping*

*Disconnect patient from ventilator & allow to exhale stacked breaths. When reattaching, ventilate with **obstructive strategy** with trouble shooting as per **obstructed lungs**.*

If **Vt low** and **P_{peak} low** alarms, press **Monitoring 2**

V_{leak} >10% (rr<10%) **= *Leak***

BVM patient
- if ETT leak issue; reposition/replace
- if circuit issue; reconnect/ replace

If ventilation continues to be difficult, please discuss with ICU registrar regarding further troubleshooting

initial settings for HAMILTON-TI ven r

ASV Adaptive Support Ventilation

To be used as rescue ventilation mode only after consultation with ICU registrar

Adult/Ped
Male or Female

Pat. height

sets MV (Vt x Rate) of 100ml/Kg IBW

sets MV (Vt x Rate) of 100ml/Kg IBW

Start Ventilation

≈ Standard strategy

%MinVol

110% for normal lungs *(10% for dead space)*
130% for febrile/ARDS/pregnancy
150% for metabolic acidosis
-titrate by 10% to desired CO_2/pH

PEEP/ CPAP

5 *(default)* - titrate using PEEP/O_2 scale

5	5	8	8	10	10	10	12	14	14	14	16	18	18	20	22	24
30	40	40	50	50	60	70	70	70	80	90	90	90	100	100	100	100

Oxygen

to titrate SpO_2 of 92-94%

≈ Obstructive strategy

70% for asthma/COPD
- titrate using **flow/time graph** to avoid breath stacking; permissive hypercapnoea (pH>7.15)∴ sedate ++

0

100% (default) titrate to SpO_2 of 88-92%

Controls **Basic**

TiMax : 1 sec

ETS : 40%

ASV troubleshooting for HAMILTON-T1 ventilator

To be used as rescue ventilation mode only after consultation with ICU registrar

If **Low MinVol** and **Pressure limitation** alarms, press **Monitoring** **3**

R_{insp} < 15 (rr<15) C_{stat} <<50 (rr>50)	***Stiff lungs***	*Seek & Treat* *-chest causes (eg: pneumothorax)* *-abdominal causes (eg: obesity, ascites)*	
R_{insp} >>15 (rr<15) C_{stat} > 50 (rr>50)	***Obstructed lungs***	*Seek & Treat* *-kinked /blocked tube* *-bronchospasm*	↑ **Pasvlimit** in increments of 10 to allow MinVol (max 70)
R_{insp} >>15 (rr<15) C_{stat} <<50 (rr>50)	***Gas Trapping***	*Disconnect patient from ventilator & allow to exhale stacked breaths*	↑ **Pasvlimit** in increments of 10 to allow MinVol (max 70)

If **P_{peak} low** and **low MinVol** alarms, press **Monitoring** **2**

V_{leak} >10% (rr<10%)	***Leak***	*BVM patient* *-seek and treat ETT issue (reposition/ replace)* *- seek and treat circuit issue (reconnect/ replace)*

initial settings for **HAMILTON-TI** ventilator

NIV-ST
NIV Spontaneous Timed
(rescue breaths if apnoeic)

Adult/Ped
NIV-ST
Start Ventilation

≈ Standard strategy
(type-1 respiratory failure)

≈ Obstructive strategy
(type-2 respiratory failure)

PEEP/CPAP

5 *(preset)* -titrate using PEEP/O_2 scale

5	5	8	8	10	10	10	12	14	14	14	16	18	18	20
30	40	40	50	50	60	70	70	70	80	90	90	90	100	100

to SpO_2 of 92-95%

5 *(preset)*

Oxygen

100% *(preset)*-titrate to SpO_2 of 86-92%

Pinsp

5 (preset)-titrate to **VTe ≥ 6ml/Kg IBW.**
If after 15mins, RR > 25, ⬆VTe by 2ml/kg every 15 mins (max: 10mg/kg/IBW)

(if PEEP/Pinsp=5/5, then IPAP/EPAP = 10/5)

	5'0" 153cm	5'2" 156cm	5'4" 163cm	5'6" 168cm	5'8" 173cm	5'10" 178cm	6'0" 183cm	6'2" 188cm	6'4" 193cm
6ml/kg female	276	296	330	360	385	415	440	470	490
6ml/kg male	305	320	360	385	415	440	470	490	520
8ml/kg female	364	401	438	474	511	548	485	622	658
8ml/kg male	400	437	474	510	547	584	621	658	694
10ml/kg female	455	500	546	592	638	685	730	777	822
10ml/kg male	500	546	592	638	685	730	777	822	868

Controls More

P-ramp: 50ms
TiMax : 1 sec
ETS : 40%

NIV-ST Troubleshooting for HAMILTON-T1 ventilator

NIV Spontaneous Timed

If **Vt low** and **Pressure limitation** alarms, press **Alarms** increase pressure limitation in increments of 10 to allow VTe. *Maximum IPAP (PEEP+Pinsp) = 25*

If **Vt low** and **P_{peak} low** alarms, press **Monitoring** **2**

V_{leak} >10% (rr<10%) **= *Leak***

BVM patient
- if ETT leak issue; reposition/replace
- if circuit issue; reconnect/ replace

Acute Pulmonary Oedema:

- Start **PEEP at 10cmH_2O** and titrate up as per **Protective strategy** while rapidly titrating high-dose IV GTN to achieve patient's normal blood pressure within 30 minutes.
- Avoid NIV if patient is hypotensive (cardiogenic shock).

Patients on home ventilators (including Obstructive Sleep Apnoea (OSA):

Check EMR for their usual ventilator pressures, please note

- PEEP = EPAP (= CPAP if Pinsp = 0)
- Pinsp = IPAP-EPAP
- CPAP for OSA is used to splint the **upper airway** open as opposed to the alveoli. This often requires much higher levels of PEEP. If CPAP pressure is unknown, start at **(actual body-weight in kg)/10** and titrate.