1 Quick Start Setup

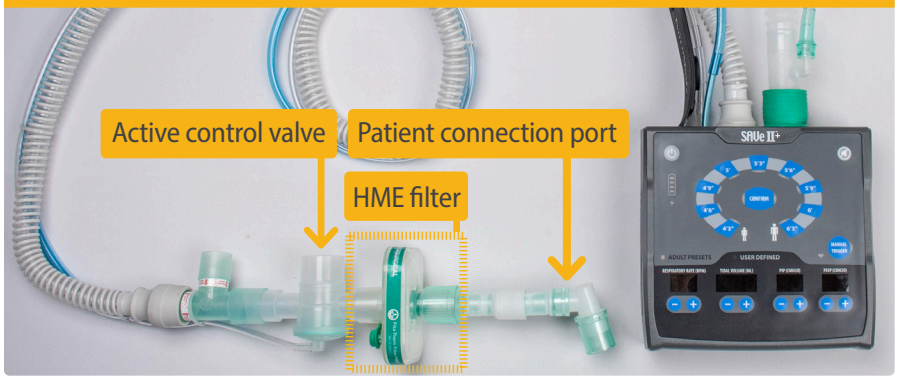
SAVe II+ is an invasive ventilator that delivers up to 12 LPM of minute ventilation, using height presets to dial in an ARDSnet protocol of 6mL/Kg of ideal body weight; not suited for CPAP/BiPAP.

Volume-targeted • Pressure-limited • Accepts supplemental O2

✓ Adjustable PEEP ✓ Adjustable PIP Limit ✓ Adjustable TV ✓ Adjustable RR

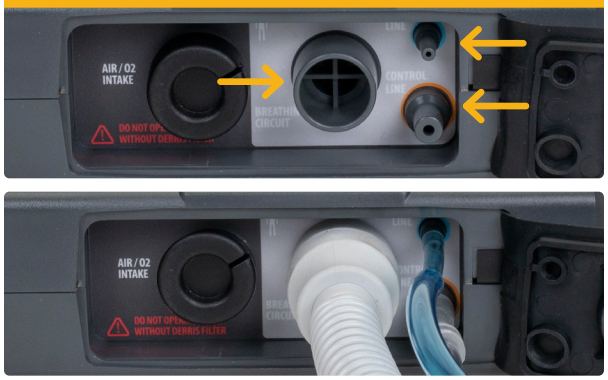
1 Before you begin: Establish and confirm airway

2 Insert Heat and Moisture Exchanger (HME) filter into breathing circuit



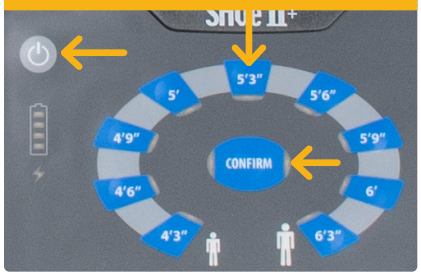
[If required by protocol] Insert Heat and Moisture Exchanger (HME) filter into the circuit between active control valve and patient connection port.

3 Connect breathing circuit



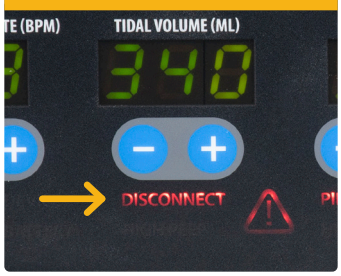
Connect all three tubes on the breathing circuit to corresponding ports on the device.

4 Turn on, set height, and confirm



Turn on the device using the power button. Select patient height and press CONFIRM. This sets a size-appropriate tidal volume (TV) and a default respiratory rate. Adult presets default to male. See Table 1 in Section 2b to adjust tidal volume for female patients.

5 Verify disconnect alarm



Before connecting to patient, verify alarms: first, verify the DISCONNECT alarm appears and sounds.

6 Verify PIP reached alarm

Then verify the PIP REACHED alarm by covering the patient connection port.

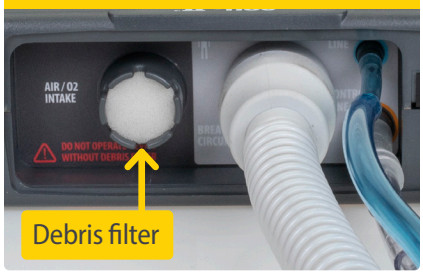
7 Connect to airway *[FiO2 21%]*

If NOT using supplemental oxygen (O2): Connect SAVe II+ to patient airway. Verify adequate chest rise and breath sounds. Monitor alarms.

If using supplemental O2, first connect O2 reservoir tube and set FiO2.

2a Connecting to supplemental oxygen [FiO2 >21%]

1 Remove air intake cap



Remove and store black cap, leave debris filter in place.

2 Connect O2 reservoir tube

Connect the expandable O2 reservoir tube to the AIR / O2 INTAKE port.

3 Expand reservoir and connect O2

Fully expand O2 reservoir tube. Do not block the air intake side of the reservoir tube. Connect the low-pressure O2 line to a flow-regulated supplemental oxygen source.

Set FiO2 → Page 2

2b Refine tidal volume and set FiO2 (Fraction of inspired oxygen)

1 Refine tidal volume

Set tidal volume using the TIDAL VOLUME +/- control buttons and press CONFIRM. Monitor patient and alarms.

	Tidal Volume			
	6mL/Kg		8mL/Kg	
Height	Male	Female	Male	Female
5'0"	300	270	400	370
5'1"	310	290	420	380
5'2"	330	300	440	400
5'3"	340	310	460	420
5'4"	360	330	470	440
5'5"	370	340	500	460
5'6"	380	360	510	470
5'7"	400	370	530	500
5'8"	410	380	540	510
5'9"	420	400	570	530
5'10"	440	410	580	550
5'11"	450	430	600	570
6'0"	470	440	620	580
6'1"	480	450	640	600
6'2"	490	470	660	620
6'3"	510	480	680	640
6'4"	520	490	700	660
6'5"	540	510	710	680

Table 1
Tidal volume based on ideal body weight at each height, rounded to the nearest 10. Save II+ presets default to male at 6mL/Kg.

2 Calculate minute ventilation based on the respiratory rate and tidal volume (RR x TV)

Respiratory Rate (RR) in Breaths Per Minute (BPM)	Tidal Volume (TV) in milliliters (mL)												Minute Ventilation in Liters per Minute (LPM)
	200	250	300	350	400	450	500	550	600	650	700	750	800
8	2	2	2	3	3	4	4	4	5	5	6	6	6
9	2	2	3	3	4	4	5	5	5	6	6	7	7
10	2	3	3	4	4	5	5	6	6	7	7	8	8
11	2	3	3	4	4	5	6	6	7	7	8	8	9
12	2	3	4	4	5	5	6	7	7	8	8	9	10
13	3	3	4	5	5	6	7	7	8	8	9	10	10
14	3	4	4	5	6	6	7	8	8	9	10	11	11
15	3	4	5	5	6	7	8	8	9	10	11	11	12
16	3	4	5	6	6	7	8	9	10	10	11	12	
17	3	4	5	6	7	8	9	9	10	11	12		
18	4	5	5	6	7	8	9	10	11	12			
19	4	5	6	7	8	9	10	10	11				
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26	5	7	8	9	10	12							
27	5	7	8	9	11								
28	6	7	8	10	11								
29	6	7	9	10	12								
30	6	8	9	11	12								

Not allowed TV / RR combinations

Table 2
Minute ventilation in Liters per Minute (LPM), rounded to the nearest whole number, based on allowable RR and TV combinations.

3 Determine desired FiO2 per your clinical guidelines.

4 Determine the appropriate O2 Flow Rate. Use calculated minute ventilation (A) and desired FiO2 (B) to find flow rate (C)

A

Desired FiO2 (%) (B)	Calculated Minute Ventilation											Set O2 flow rate (L/min) to: (C)
	2 LPM	3 LPM	4 LPM	5 LPM	6 LPM	7 LPM	8 LPM	9 LPM	10 LPM	11 LPM	12 LPM	
60%	50%	40%	40%	35%	30%	30%	30%	30%	30%	30%	1
100%	75%	60%	55%	50%	45%	40%	40%	40%	35%	35%	2
100%	80%	70%	60%	55%	50%	50%	45%	45%	40%	3
100%	85%	75%	65%	60%	55%	55%	50%	50%	4
100%	90%	80%	70%	65%	60%	60%	55%	5
100%	90%	80%	75%	70%	65%	60%	6
100%	90%	80%	75%	70%	70%	7
100%	90%	85%	80%	75%	8
100%	90%	85%	80%	9
100%	95%	90%	10
100%	95%	11
100%	12

Table 3
Calculated values for delivered FiO2 % based on minute ventilation and supplemental O2 flow rate. Rounded to nearest 5%. Measured values may vary +/-10%.

5 Set the flow rate (L/min) on your supplemental O2 to the value determined in the previous step.

6 Connect SAVe II+ to patient airway. Verify adequate chest rise and breath sounds. Monitor alarms.

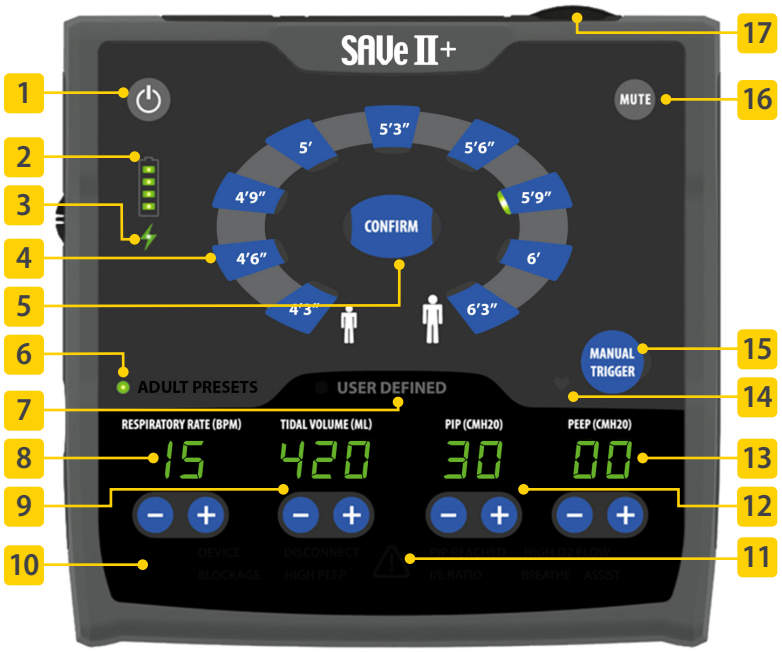
3 Limitations and capabilities

Limitation	Details
⚠ **Manual titration of FiO2** (via bleed-in supplemental oxygen)	In SAVe II+, **you don't directly set FiO2 with a digital keypad**. FiO2 is determined by minute ventilation and the amount of supplemental O2 delivered to the circuit via low-pressure (regular) oxygen tubing. **See Page 1 Section 2a "Connecting to Supplemental Oxygen" for step-by-step illustrated instructions.**
⚠ **Limited** Minute Ventilation	**Maximum minute ventilation is 12 LPM.** See Table 2 in Section 2b of this guide for allowed RR / TV combinations.
⚠ **Limited** I:E Ratio	**I:E ratio is fixed at 1:2.**
✕ **NO** pressure support mode	The **device will deliver a breath if the patient is spontaneously breathing**, but does not include a pressure support mode.
✕ **NOT** for non-invasive ventilation	No CPAP / BiPAP; not to be used for mask ventilation unless no alternative is available.
✕ **NOT** MRI compatible	Do not put the SAVe II+, any components, or accessories near or inside an MRI machine.

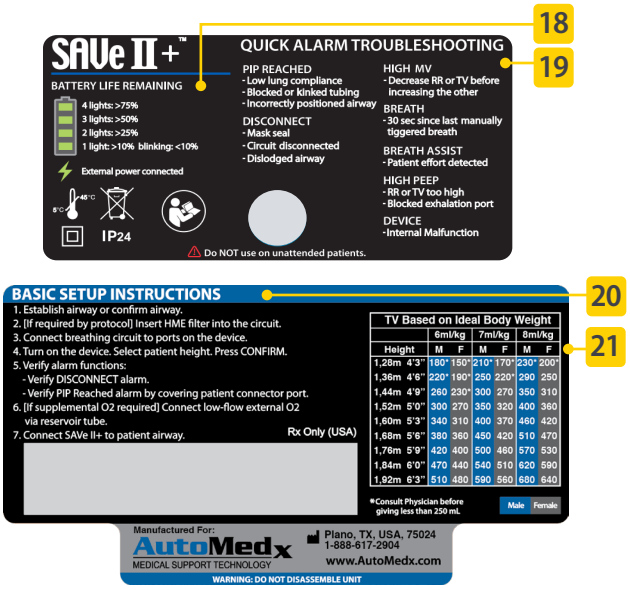
Capability	Details
✓ Adjustable PEEP	Range 0-20, increments of 1 cmH2O, **PEEP max is 20**.
✓ Adjustable PIP Limit	Range 10-60, increments of 5 cmH2O, **default is 30**.
✓ Adjustable TV	Range 200-800, increments of 10mL. Actual range is limited by RR; see Table 2 in Section 2b for allowable combinations.
✓ Adjustable RR	**Range 8-30** (RR may be set to 0 for manual mode), increments of 1 breath / min. Actual range is limited by TV; see Table 2 in Section 2b for allowable combinations.
✓ Manual mode	Set RR to 0 and CONFIRM to enter manual mode (CPR mode). Each breath is delivered by pressing MANUAL TRIGGER button.
✓ Battery-powered	When available, device should be connected to an external power source via the provided cord. Battery lasts up to 10 hours on a single charge.
✓ View most recent measured PEEP / PIP	To view the most recent measured [actual] PEEP or PIP, press the CONFIRM button when no changes are pending.
✓ Ventilation without supplemental O2	If supplemental O2 is unavailable, the device will still work, but FiO2 will be limited to 21% (room air). Oxygen reservoir tube is not necessary for this function.

4 Device layout

Front panel



Back panel



Device layout overview

1. **Power on/off** - Press for 1 second to turn on. Hold for 3 seconds to turn off.
2. **Battery life** - Indicates remaining battery life.
3. **External power** - Indicates external power is connected.
4. **Adult height presets** - Control and indicator used to set default ventilator parameters based on patient height and monitor current setting. Adult presets default to male. See Table 1 in Section 2b to adjust Tidal Volume for female patients.
5. **Confirm** - Control and indicator used to prevent unintended changes. Blinking indicates the ventilator parameter settings must be confirmed to become active. When all parameter settings are confirmed, pressing the CONFIRM button will show the actual PIP and PEEP values in the PIP and PEEP displays for 3 seconds.
6. **Adult height presets indicator** - Indicates device set using preset patient height parameters.
7. **User defined indicator** - Indicates device set to user defined parameters.
8. **Respiratory rate** - Control and display used to set the respiratory rate (RR) and monitor the set number of breaths delivered each minute.
9. **Tidal volume** - Control and display used to set the tidal volume (TV) and monitor the set volume in milliliters delivered each breath.
10. **Alarms** - Alarm codes will illuminate in red to alert the operator of various conditions.
11. **Hazard indicator** - Illuminates for all errors and alarms; may be the only indicator if the battery is disconnected or there is a major malfunction.
12. **PIP** - Control and display used to set the PEAK INSPIRATORY PRESSURE (PIP) limit (pressure cutoff). Once the setting is confirmed the display stays fixed, however, the device measures the peak pressure breath to breath.
13. **PEEP** - Control and display used to set the POSITIVE END-EXPIRATORY PRESSURE (PEEP) and display the set PEEP of each breath.
14. **Compression rate** - Indicator blinks at a rate of 100/minute to aid users performing chest compressions when device is in MANUAL / CPR mode (RR set to zero [0]).
15. **Manual trigger** - Control used to deliver a breath at the set tidal volume. Breaths may be triggered in MANUAL / CPR mode AND during ventilation.
16. **Mute** - Silences an active audible alarm for 120 seconds. New alarm will override. If alarm condition persists after 120 seconds the audible alarm will resume.
17. **Breathing circuit port cover** - Access to ports for patient circuit, pressure line, control line, and AIR/O2 intake.
18. **Quick alarm troubleshooting guide** - See manual for detailed descriptions.
19. **Battery capacity reference**
20. **Basic setup instructions** - Illustrated setup instructions start on Page 1 of this guide, see manual detailed instructions.
21. **Tidal volume reference table** - Reference for refining tidal volume by height, sex, and strategy.