



SERVO-U

– hands-on guide

Introduction

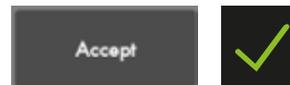
There are different ways to navigate the user interface, adjust settings and get support.

The objective with this SERVO-U® hands-on guide is to guide you through some of the most important steps you need to familiarize yourself with when starting to use the SERVO-U ventilator. Please see the User Manual for more information.

To go through these exercises you need a SERVO-U 2.1, O₂ and air supply, patient

circuit and a test lung. The exercises can be done individually or in sections. It takes approximately 30 minutes to do the entire SERVO-U hands-on guide. Knowledge Check questions with answers can be found at the end of the guide.

NOTE: Some modes are options and might not be included.



Confirm the settings by tapping Accept or the green check mark.



Exit settings without changing by tapping cancel or the red x.



Close by tapping the green x.

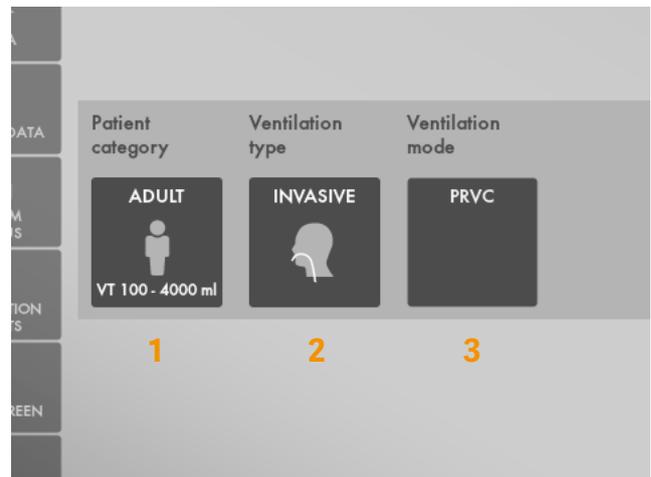
Setting up the SERVO-U

Follow step by step (see corresponding images and notes):

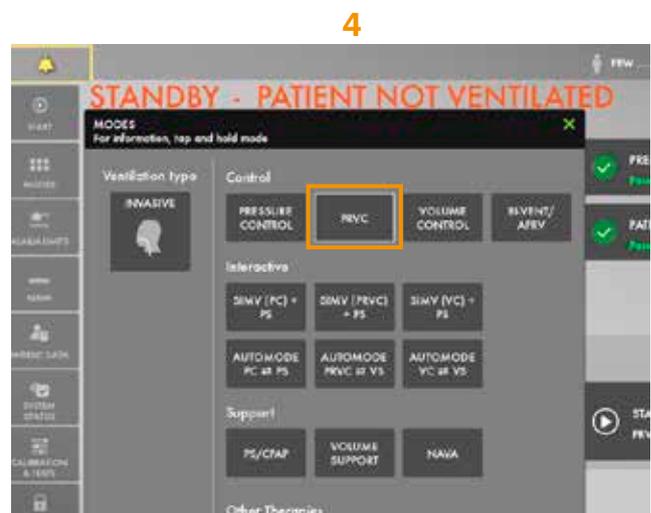
1. Plug in the power cord.
2. Open the hatch on the side and switch the ventilator to on.
NOTE: When switching on the SERVO-U, you need to pull the ON/OFF switch downwards.
3. Connect the air and oxygen hoses.
4. Lock the wheels. It's important to lock the wheels when the ventilator is in use to avoid accidental movement of the ventilator.
5. Start the **PRE-USE CHECK**. (You need the test tube during the Pre-Use Check).
6. Follow the instructions on the screen.
7. Included in the Pre-Use Check is the patient circuit test. Connect the patient circuit.
8. Connect a test lung to the patient circuit.
NOTE: Pre-Use Check includes pressure and flow transducers calibration. Each test starts automatically after the previous test is completed. The patient circuit test is included in the Pre-Use Check, but can be selected separately.
9. Choose patient category: **ADULT. (1)**
10. Choose Ventilation type: **INVASIVE. (2)** (You can also choose NON INVASIVE here).
11. Tap on Ventilation mode **PRVC. (3)** (Depending on start up the configuration a different mode can be shown here.)
NOTE: Some modes are options and might not be included. Information is available for each mode.
12. Then tap and hold the **PRVC** tile. **(4)**
13. Close by tapping **X**.



2

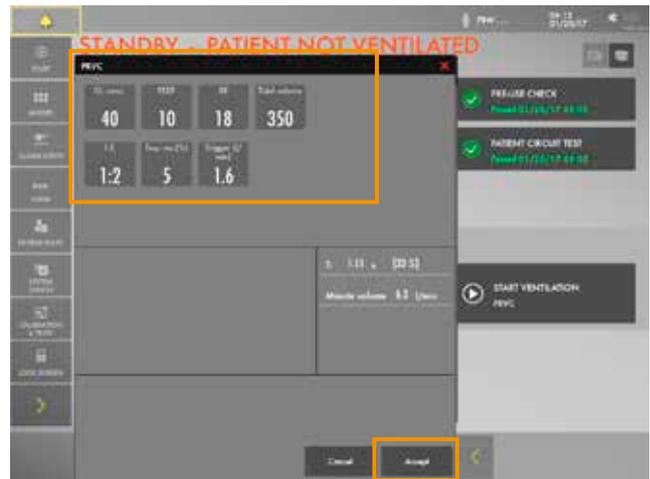


9-11



12

14. Select Mode by tapping **PRVC**.
15. Change the:
 - Tidal volume to 350ml
 - Respiratory rate to 18b/min
 - Peep to 10cm H₂O
16. **ACCEPT** the mode settings. **(1)**
17. Go to **ALARM LIMITS** in **QUICK MENU**. **(2)**
18. Change the alarm limits:
 - Alarm sound: 6
 - Ppeak: 30cm H₂O
 - RR (Respiration Rate): High 12b/min
 - Mve (Minute volume): Low 8.0L/min
19. **ACCEPT** the alarm settings. **(3)**
20. Tap **START VENTILATION**.



14-15

1

19. **ACCEPT** the alarm settings. **(3)**
20. Tap **START VENTILATION**.



16-19

3

Alarms

21. The alarms are turned off for 30 seconds after starting ventilation. **(4)**

NOTE: Alarms can be in one of three colours: red, yellow or blue, depending on priority.
22. Tap the activated alarm in message bar **(5)** and read the messages.

NOTE: The number of alarms that are active are displayed in the status bar at **(6)**
23. Tap the red tile in the numerical values **MVe** alarm. **(7)**

NOTE: By tapping the activated alarm in the numerical values field, you gain access to the alarm setting (shortcut).



21-23

- 24. Go to alarm limits. Adjust the alarms so none are active.

NOTE: The arrow indicates the current measured value. (1)

- 25. Activate the **AUTOSET** function by tapping. (2)

NOTE: The alarm autaset function can only be used in controlled modes.

- 26. Tap the **i** placed next to Ppeak alarm setting. (3)
You can find more information about the alarm setting there.

NOTE: The information sign can be found in different positions on the Graphic User Interface.

- 27. **ACCEPT** the alarm settings.

NOTE: When ventilating, you can see that the patient circuit test has been performed by the symbol  - The symbol will not appear if a patient test has not been done. (4)

- 28. Decrease the PEEP to 4 cm H₂O (use the direct access keys) and increase the scale by tapping the **+**. (5)
Then increase the PEEP to 26 cm H₂O. Cancel the settings by tapping the **×**.

NOTE: The color changes when the settings are changed outside the normal range.



24-26



26 Note



27

5

VT/PBW

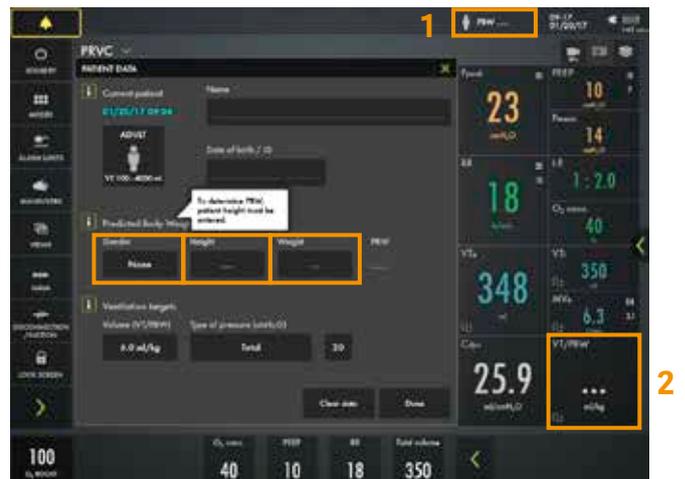
29. Tap **PBW** or the **VT/PBW** to open PATIENT DATA. (1)
30. Enter gender **FEMALE**.
31. Enter **HEIGHT** 160 cm.
32. Enter **WEIGHT** 75kg.

NOTE: The predicted body weight is often not the same as the patient's actual weight (in Neonatal and Pediatric patient categories the actual weight is entered).

33. Check the ml/kg setting. (2)
34. Go to the direct access bar and change the **TIDAL VOLUME** so you receive 6ml/kg. (3)

Mode setting

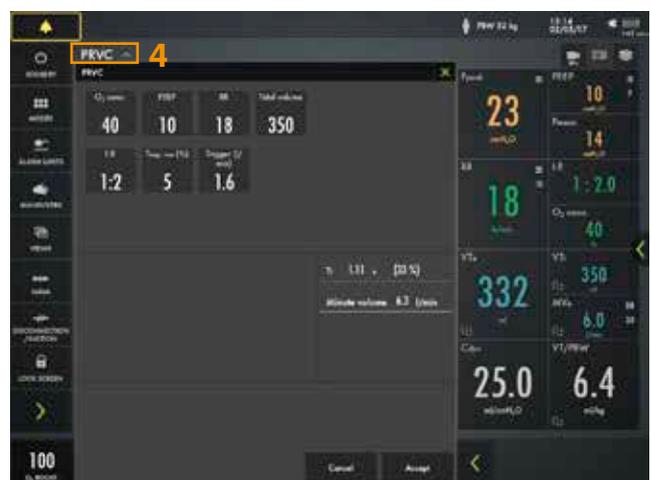
35. Tap the mode **PRVC** and open the mode setting. (4)



29-33



34



35

36. Change the **TRIGGER** value to pressure triggering -1 cm H₂O.
NOTE: Read the text by the scaling. Less patient effect and more patient effect. (1)
37. Change the I:E (or Ti if this is configured.)
NOTE: The changes of the dynamic images.
38. **CANCEL** changes.
39. Make a quick change of O₂ to 100%. Change the O₂ setting in the direct access bar to 100% by tapping on the 100% directly on the sliding scale. **(2)**
40. **CANCEL** the changes by tapping the **✗**.
41. Tap **MODES** in the QUICK MENU and choose PS/CPAP.
42. Change the **END INSPIRATION** to 40 % and then to 60%. Look at how the dynamic image changes.
43. **ACCEPT** 60%.
44. **ACCEPT** PS/CPAP mode.
45. Compress the test lung to trigger breaths.

NOTE: The white indicates the triggering in the waveforms, depending on how the trigger is set (pressure or flow) the colour indication changes - if pressure triggering is set- white indication in pressure waveform. If flow triggering is set- white indication in flow waveform. Also there is a lung on the screen indicating the triggered breath.



36 **1**



39 **2**



45

46. Stop compressing the test lung.

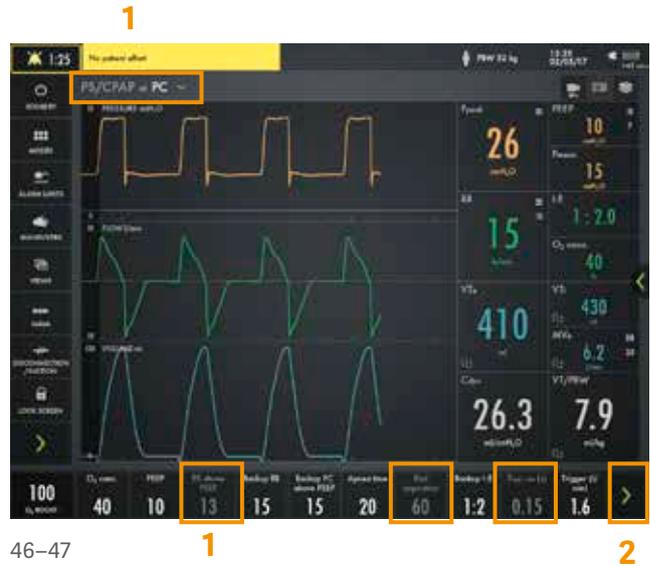
NOTE: The colour changes to bold white for PC and the BACKUP settings. The mode and settings that are not active are grey. (1)

47. Tap the **>** in the direct access bar (2), you then have access to all the mode settings directly.

48. Go to **MODES** and change back to **PRVC**.

NOTE: It is marked previous. (3)

49. Accept previous settings.



46-47

Views

50. Go to **VIEWS** in **QUICK MENU**. (4)
Change to BASIC view.

51. Use the **<** to find additional values. (5)

52. Go through the different views; **DISTANCE, FAMILY, LOOPS** and **SERVO COMPASS** view.



48



50

53. If SERVO COMPASS view is available, tap on the **SERVO COMPASS**.

NOTE: You can choose the target for ml/kg and Driving or total pressure.

54. Compress the testlung.

NOTE: The pressure symbol turns red.

55. Change back to **ADVANCED** view.

56. Go to **SCREEN LAYOUT**.

NOTE: Here can the SERVO COMPASS be switched on/off (option). (1)

57. Change to filled waveforms by tapping the waveform image. **(2)**

58. Change back to non-filled waveforms.



51



53-54



56-58

Media

59. Tap the **RECORDER** once and tap the **CAMERA** in the status bar three times. (1)

NOTE: A 30 second recording will be made starting 15 seconds before and lasting until 15 seconds after the recording is initiated.

60. Choose (2) to access **MEDIA**. Navigate between the different screenshots and the recording.

NOTE: Screenshots are displayed at the bottom of the window.

61. Find the USB port by flipping the screen.

NOTE: You can use a USB memory stick to export the data (e.g. screenshots).



59–60

NAVA & NIV NAVA

62. Go to **NAVA** in **QUICK MENU**. (3)

63. Find the workflow of NAVA/NIV NAVA under the **i**.

64. Go to **CALCULATION TOOL**.

65. Chose **16FR EDI CATHETER**.

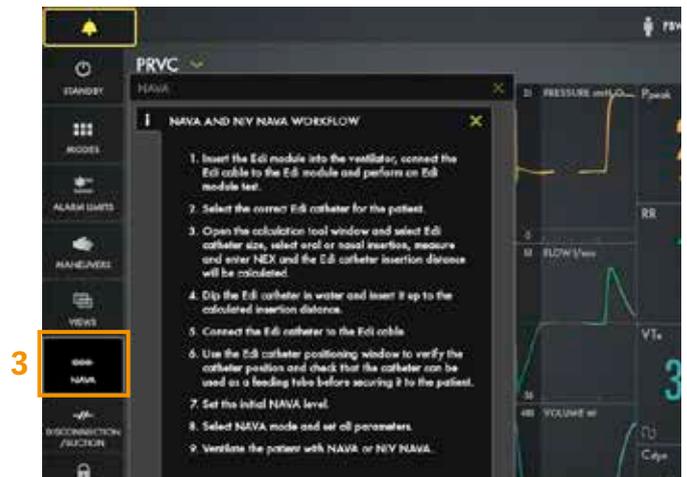
66. Chose **NASAL** insertion.

67. Enter **NEX** 52 cm.

68. Edi catheter insertion distance is presented.

NOTE: The insertion distance calculation often needs to be titrated using the ECG.

69. Go to **EDI CATHETER POSITIONING**.



63



64–69

70. Tap the **i**.

NOTE: The yellow curve is the pressure waveform and the grey curve is the pressure estimated for NAVA.

71. Close by tapping the **X**.

72. Go to **NAVA MODE** and tap **i**.

NOTE: The mode is divided in NAVA and PC (backup mode).



70 Grey Curve Yellow Curve

Disconnect/ Suction

73. Go to **DISCONNECT/SUCTION** in **QUICK MENU**. (1)

74. Change the **O₂ CONCENTRATION** to 40%. (2)

75. Accept **DISCONNECT/SUCTION** function.

76. Disconnect the test lung.

77. Reconnect the test lung.

78. **CANCEL** post-oxygenation.

NOTE: When disconnection/suction is activated the ventilator system is prevented from cycling without activating alarms.



72



73-78

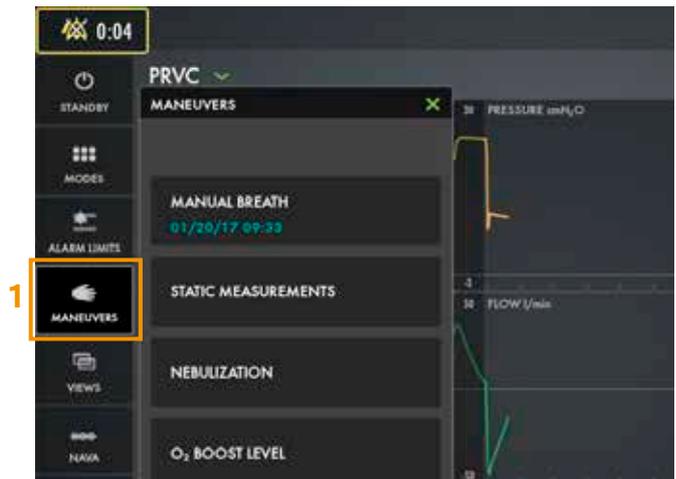
Maneuvers

79. Go to **MANEUVERS** in **QUICK MENU. (1)**
80. Activate **MANUAL BREATH** by tapping.
81. Go to **STATIC MEASUREMENT.**
82. Tap **INSPIRATORY HOLD** and hold for 4 seconds, and then **EXPIRATORY HOLD** for 4 seconds. **(2)**
83. Observe the PEEP_{tot} value.

NOTE: PEEP_{tot} value is the set PEEP + intrinsic PEEP.

84. Go to **NEBULIZATION.**

NOTE: You can choose continuous nebulization  or a nebulization period . The time for nebulization can be changed. When nebulization is activated there will be the corresponding nebulization symbol on the screen. By tapping the symbol you can stop nebulization.



79



81-82



84

Battery

85. Unplug the mains cable.

86. Click on the battery symbol . (1)

NOTE: You can see how much capacity remains for each battery.



86

Lock screen

87. **LOCK** the screen is found in Quick Menu, Lock screen.

88. Tap anywhere on the screen and see what happens.

89. **UNLOCK** the screen by tapping on the Locking Symbol.



87

O₂ boost

90. Activate **O₂ BOOST** by tap and hold. (2)

NOTE: O₂ boost is active for one minute.

91. **CANCEL** O₂ boost by tapping .

92. Go to **MANEUVERS** and select **O₂ BOOST**. Unlock the 100% O₂ boost by tapping the 100% lock symbol.

93. Observe the new **O₂ BOOST** level. Change the **O₂ BOOST LEVEL** to 40% and accept .



90-93

Trends

94. Go to **TRENDS** in the **EXTENDED MENU** . (1)
95. Change the trend scale to 1 hour. (2)
96. Drag the cursor and note that each event/changes have been trended.
97. Tap **ORGANIZE** to change the order of the trends. (3)

Note: Trend values are stored every 60 seconds and retained for a maximum of 72 hours.

98. Put the RR sp, RR at the top by dragging and dropping **TRENDS**.

Note: You can see the trend of VT/PBW and driving pressure.

99. Close the window by tapping .
100. Tap **MODES**.

NOTE: You can go directly to HFT without going to Standby.



94



3

95-96

2

Stop ventilation

101. Tap **STANDBY** in **QUICK MENU** and then tap and hold **STOP VENTILATION**.

NOTE: If Edi is connected it is possible to go directly to Edi Monitoring in standby.



101

Knowledge check

1. Why is it important to have the same patient circuit that will be used for the patient when performing the patient circuit test?

2. Which priority level does the red alarm have? HIGH, MEDIUM or LOW priority?

3. Can autoreset of alarm settings be used in supported modes?

4. Is pressure triggering of -1 easier or more difficult than Flow triggering of 1.6 l/min. (for the patient to trigger the breath)?

5. Is the end inspiration of 40% expiration longer or shorter than 60%? Look at the dynamic image and text.

6. How can you see on the screen that the patient is triggering?

Answers

1. If the correct circuit is not tested, the following risks may arise:
 - In volume-based modes, the volume delivered to the patient will be incorrect.
 - In pressure-based modes, the volume measured will be incorrect.
2. Red – High Priority alarms. Yellow – Medium priority alarms. Blue – Low priority alarms.
3. Autoset is not available in supported or NIV modes or in STANDBY because the ventilator system requires patient values in order to propose alarm limits.
4. Flow triggering of 1.6l/min is easier to trigger than breath than pressure triggering of -1.
5. End inspiration of 40% gives a longer inspiration than 60%.
6. There is a lung on the screen indicating the triggered breath. Also there is a white indication in the wave-forms. (if pressure triggering is set- white indication in pressure waveform and if Flow triggering is set- white indication in flow curve).



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