



Servo-n

– hands-on guide

Introduction

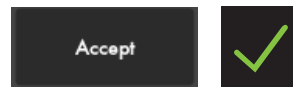
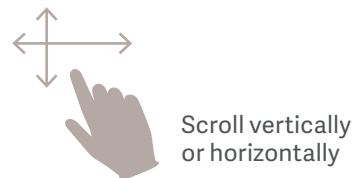
There are different ways to navigate the user interface, adjust settings and get support.

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

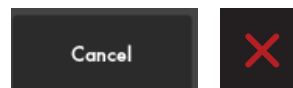
To go through these exercises you need a Servo-n 2.1, O₂ and air supply, patient circuit, Y sensor and a test lung. The

exercises can be done individually or in sections. It takes approximately 30 minutes to do the entire Servo-n 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.

Servo-n 2.1. This guide is intended for hospital personnel as a hands-on training using the Servo-n ventilator. It does not cover all aspects of the Servo-n ventilator. Please see the user's manual for more information. Some modes and functions are options and might not be included.

Setting up the Servo-n

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

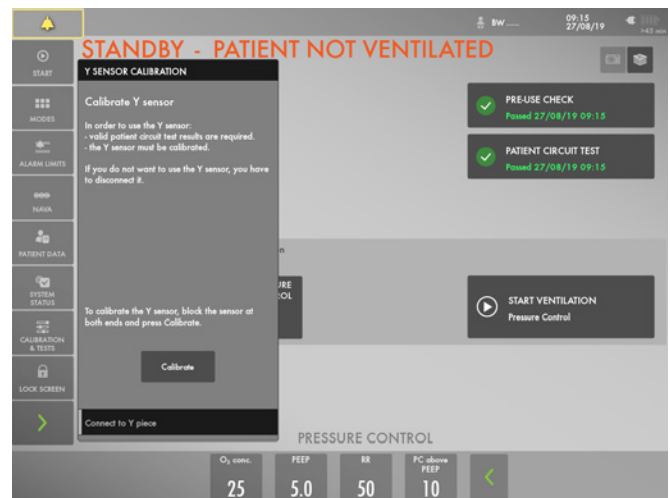
1. Plug in the power cord.
2. Open the hatch on the side and switch the ventilator to on.
NOTE: When switching on the Servo-n, you need to pull the ON/OFF switch downwards.
3. Connect the air and oxygen hoses.
4. Lock the wheels. It's important to lock the wheels when the ventilator is in use to avoid 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. Connect the patient circuit and the Y sensor.

NOTE: The patient circuit test must be performed with a complete patient circuit, including all accessories (e.g. active humidifier filled with water, filter, CO₂ analyzer, Y sensor and nebulizer), that is to be used with the patient. If the patient circuit is changed after the pre-use check is completed, perform a new pre-use check or a patient circuit test.

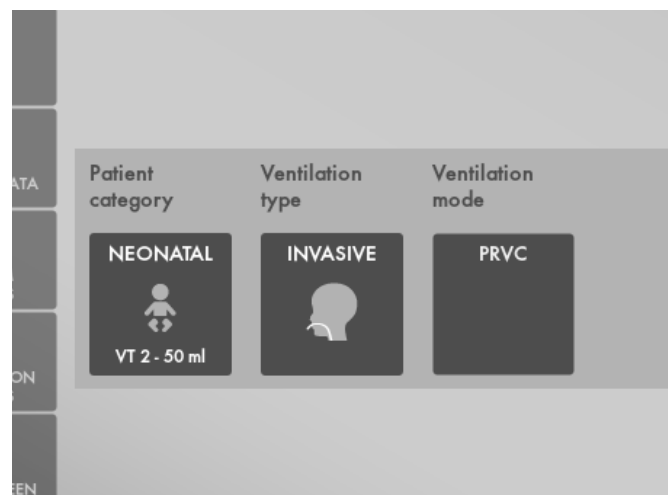
8. Connect a test lung to the patient circuit.
9. Connect the pressure line to the Y piece and module and the cable to the Y sensor and module. Calibration instruction will appear on the screen as soon as calibration is needed. Calibrate the Y sensor. If you would like to discontinue Y sensor measuring you need to disconnect the Y sensor module.
10. Choose patient category: **NEONATAL. (1)**
11. Choose Ventilation type: **INVASIVE. (2)** (You can also choose NON INVASIVE here).
12. Tap on Ventilation mode **PRVC. (3)** (Depending on the start up configuration, a different mode can be shown here.)



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10-12

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

Information is available for each mode.

13. Then tap and hold the **PRVC** tile. (1)

NOTE: It is possible to go directly to High Flow therapy from invasive modes.

14. Close by tapping **X**.

15. Select Mode by tapping **PRVC**.

16. Change the:

- Tidal volume to 8 ml
- Respiratory rate to 42 b/min
- PEEP to 5.5 cm H₂O

17. **ACCEPT** the mode settings. (2)

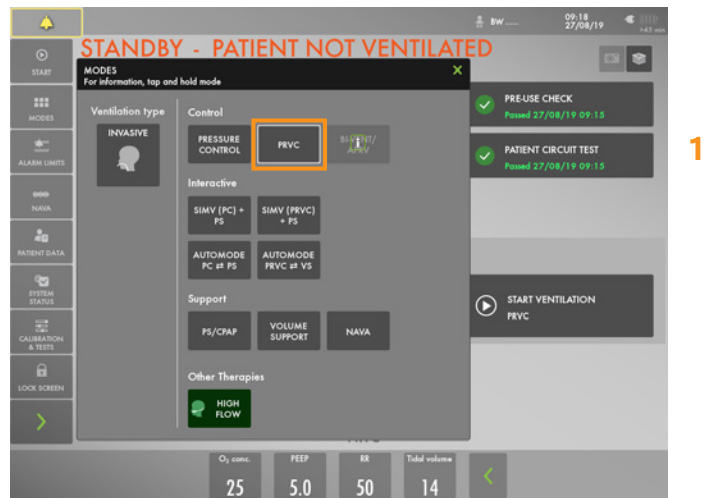
18. Go to **ALARM LIMITS** in **QUICK MENU**. (3)

19. Change the alarm limits:

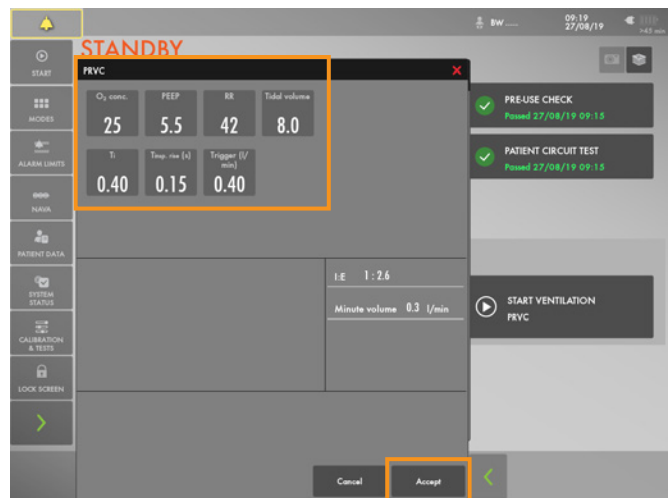
- Alarm sound: 1
- Ppeak: 30 cm H₂O
- RR (Respiration Rate): High 40 b/min
- MVe (Minute volume): Low 3.0 L/min

20. **ACCEPT** the alarm settings. (4)

21. Tap **START VENTILATION**. (5)



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16-17

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19-21

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Alarms

- The alarms are turned off for 30 seconds after starting ventilation. (1)

NOTE: Alarms can be in one of three colors: red, yellow or blue, depending on priority.

- Tap the activated alarm in message bar (2) and read the messages.

NOTE: The number of alarms that are active are displayed in the status bar at. (3)

- Tap the red tile in the numerical values MVe alarm. (4)

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

- Go to alarm limits.

NOTE: The arrow indicates the current measured value. (5)

- Activate the **AUTOSET** function by tapping. (6)

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

- Tap the **i** placed next to Ppeak alarm setting. (7) 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.

- ACCEPT** the alarm settings.

NOTE: When ventilating, you can see that the compliance tubing compensation is active by the symbol – The symbol will not appear if compliance compensation is not activated, and it requires a patient circuit test has been done. (8)

- When leakage compensation is activated, the delivered and measured volume and flow values are automatically leakage compensated, as indicated by the symbols on the affected values. (9)

- Leakage is measured and presented in percent. (10)

- When leakage compensation is used in invasive modes such as PRVC and VS in the neonatal patient category, it ensures volume delivery at the level set.



22–24



25–28



28 Note–31

32. Increase the PEEP to 11 cm H₂O (use the direct access keys) and increase the scale by tapping the **+**. (1)
Cancel the settings by tapping the **×**.

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



32

1

33. Tap BW or the **VT/BW** to open PATIENT DATA. (2)

34. Enter **WEIGHT** 800 g.

NOTE: The patient weight should be updated when patient change.

35. Check the ml/kg calculated value. (3)

36. Go to the direct access bar and change the **TIDAL VOLUME** so you receive 6ml/kg. (4)



33–35



35–36

4

Mode setting

37. Tap the mode **PRVC** and open the mode setting. (1)
38. Change the **TRIGGER** value to pressure triggering -1 cm H₂O.
 - NOTE: Read the text by the scaling. Less patient effort and more patient effort. (2)**
39. Change the T_{insp} rise.
 - NOTE: The changes of the dynamic images.**
40. **CANCEL** changes.
41. 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. (3)
42. **CANCEL** the changes by tapping the **✗**.
43. Disconnect the Y sensor cable.
44. Calibrate the Y sensor and connect to the circuit.

NOTE: For tidal volumes below 10 ml, it is recommended to use a Y sensor to increase the accuracy of gas delivery and monitoring. For large flows, the Y sensor will add a considerable resistance. When the Y sensor is active, the flow through the sensor will replace the bias flow as source for flow based triggering. The patient pressure is measured at the Y piece via a pressure line.



37-40



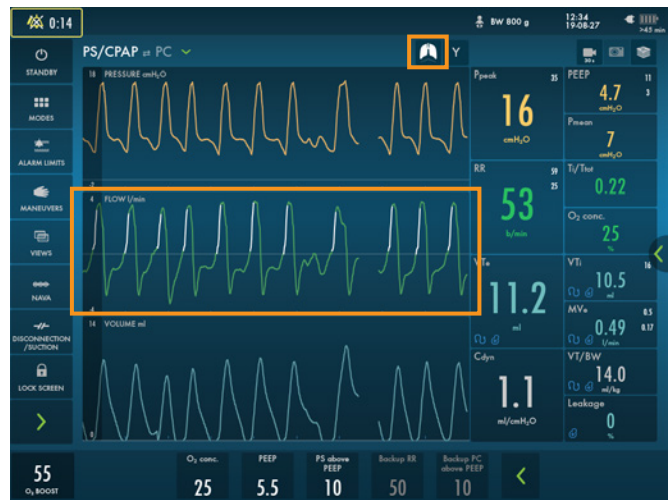
41-42



43

45. Change to PS/CPAP.
46. Change the **END INSPIRATION** to 40 % and then to 60%. Look at how the dynamic image changes.
47. **ACCEPT** 60%.
48. **ACCEPT** PS/CPAP mode.
49. 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 color 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.



49

50. Stop compressing the test lung.

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

51. Tap the **>** in the direct access bar **(2)**, you then have access to all the mode settings directly.
52. Go to **MODES** and change back to **PRVC**.

NOTE: It is marked previous. (3)

53. Accept previous settings.



48–51


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3

Views

54. Go to **VIEWS** in **QUICK MENU**. (1)
Change to BASIC view.
55. Use the  to find additional values. (2)
56. Go through the different views; **DISTANCE**, **FAMILY**, **LOOPS** and **SERVO COMPASS**® view.
57. Go to **SCREEN LAYOUT**.
58. Change to filled waveforms by tapping the waveform image. (3)
59. Change back to non-filled waveforms.



54–57

Media

60. Tap the **RECORDER** once and tap the **CAMERA** in the status bar three times. (4)

NOTE: A 30 second recording will be made starting 15 seconds before and lasting until 15 seconds after the recording is initiated.
61. Choose (5) to access **MEDIA**. Navigate between the different screenshots and the recording.

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



58–59

62. Find the USB port under the base of the screen.

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



60–62

NAVA & NIV NAVA

63. Go to **NAVA** in **QUICK MENU**. (1)
64. Find the workflow of NAVA/NIV NAVA under the **i**.
65. Go to **CALCULATION TOOL**.
66. Chose **6 FR 49 CM EDI CATHETER**.
67. Chose **NASAL** insertion.
68. Enter **NEX** 18 cm.
69. Edi catheter insertion distance is presented.

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

70. Go to **EDI CATHETER POSITIONING**.
71. Tap the **i**.

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

72. Close by tapping the **X**.
73. Go to **NAVA MODE**.

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



63-70t



71-772

Grey Curve Yellow Curve

Disconnect/ Suction

74. Go to **DISCONNECT/SUCTION** in **QUICK MENU**. (1)
75. Change the **O₂ CONCENTRATION** to 40%. (2)
76. Accept **DISCONNECT/SUCTION** function.
77. Disconnect the test lung.
78. Reconnect the test lung.
79. **CANCEL** post-oxygenation.

NOTE: When disconnection/suction is activated the ventilator system is prevented from cycling without activating alarms. The disconnect/suction function should not be used when closed suctioning is used.



74–76



77

Maneuvers

80. Go to **MANEUVERS** in **QUICK MENU. (1)**
81. Activate **MANUAL BREATH** by tapping. The ventilator system will initiate a new breath cycle according to the current ventilator settings. **1**
82. Go to **STATIC MEASUREMENT.**
83. Here you can find **INSPIRATION** and **EXPIRATION HOLD.**
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.



80-82




83



84

Battery

85. Unplug the mains cable.

86. Tap on the battery symbol . (1)

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

Lock screen

87. **LOCK** the screen is found in Quick Menu, Lock screen. (2)


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

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

O₂ boost

90. Activate **O₂ BOOST** by tap and hold. (3)

NOTE: O₂ boost is active for one minute.

91. **CANCEL** O₂ boost by tapping .

92. Go to **MANEUVERS** and select **O₂ BOOST**. It is possible to change the desired level for the O₂ boost function. Change the O₂ boost to 20%.

93. Observe the new **O₂ BOOST** level.



85–89



90



92–93

Trends

- 94. Go to **TRENDS**. (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**.



94

Note: you can see the trend of VT/BW and backup.

- 99. Close the window by tapping **X**.

Stop ventilation

- 100. 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.**



95-97

2



98

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 auto set 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. 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 1.0l/min is easier to trigger the breath than pressure triggering of -1.
5. 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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⚠ CAUTION: Federal (US) law restricts this device to sale by or on the order of a physician. Refer to Instructions for Use for current indications, warnings, contraindications, and precautions.

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