STEPHAN®

EVE

Quick Guide

Please read the detailed operating manual carefully.

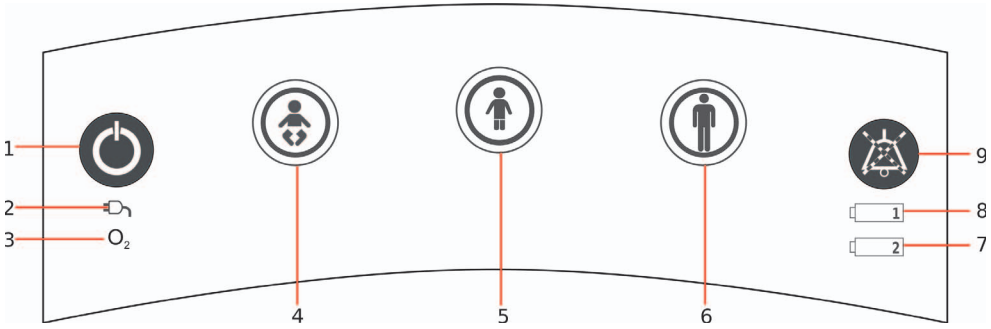
The Quick Guide does not replace the operating manual.

Equipment is subject to technical modification

Valid as of:	**04/2020**
Version:	**V1.0**
From Software version:	**2.3**
Artikel-Nr.:	**107090078**

Fritz Stephan GmbH Medizintechnik · Kirchstraße 19 · 56412 Gackenbach · Germany
Tel. +49 6439-91 25-0 · Fax +49 6439-91 25-111 · info@stephan-gmbh.com · www.stephan-gmbh.com

Design and functional description



Control panel

1 On/Off-Button

2 Mains power indicator

3 O_2 supply indicator

4 Fast tracking key „Preterm infants and newborns“

5 Fast tracking key „Child“

6 Fast tracking key „Adult“

7 Charge indicator „Battery 2“

8 Charge indicator „Battery 1“

9 Acoustic alarm suppression

Design and functional description

On/Off/Standby-Button
Press this button to switch the EVE on/off or, in the case of ongoing ventilation, to switch it to Standby mode.

Fast tracking keys
To prevent operator errors, the desired fast tracking key must be pressed for 0.5 s, after which it starts to flash green. Pressing the key again for 0.5 s will then start or switch to the selected ventilation mode.

Acoustic alarm suppression
If the key is pressed again within 5 s, the alarm suppression is canceled. Pressing the key again after 5 s has passed will start an new 2 minute countdown.

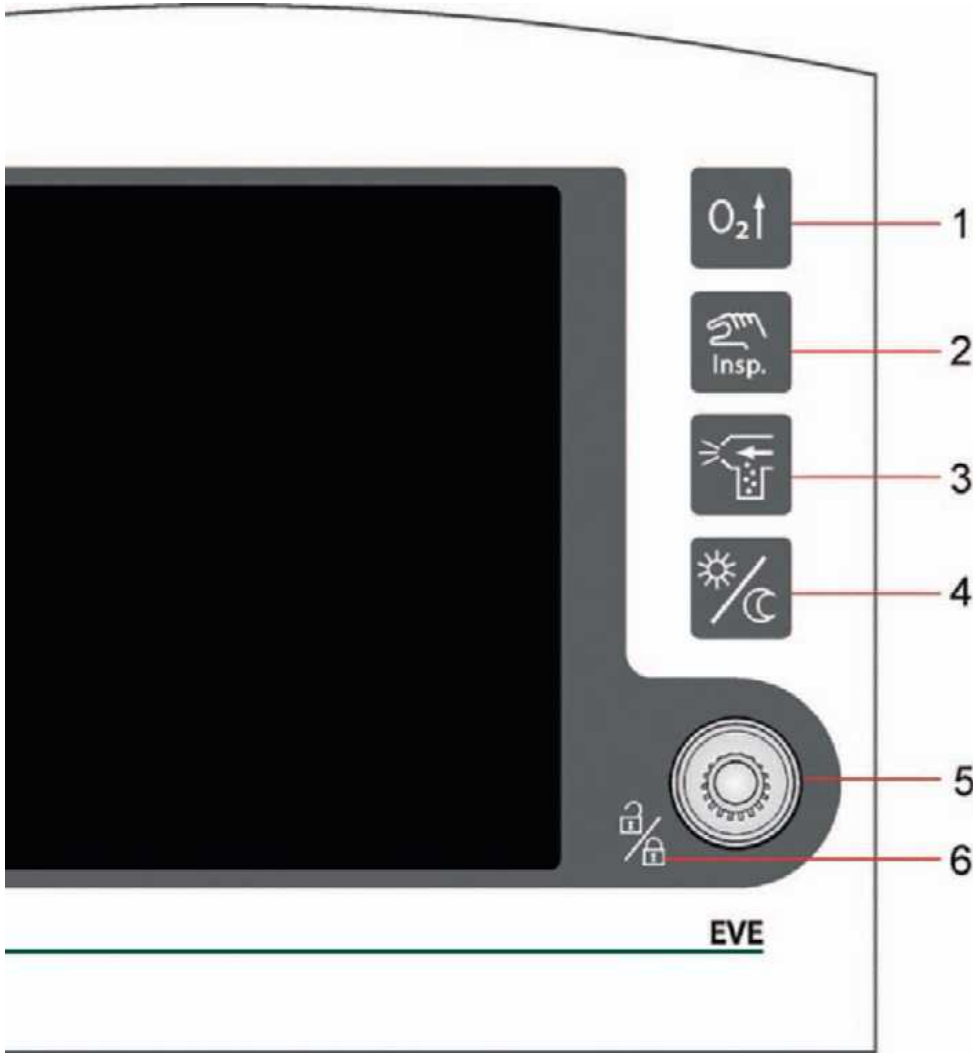
Battery charge indicator
: Capacity: 75 - 100%
: Capacity: 40 - 75%
: Capacity: 1 - 39%
, flashing: 0% or Error

Mains power indicator
When connected to the energy supply, the mains power indicator is green. The internal batteries are charged automatically as needed. The battery charge indicators tell you the current battery level.

O_2

Oxygen supply indicator
The indicator is green when an oxygen source with sufficient fill pressure is connected.

Design and functional description



Function buttons

1 Button „Preoxy“
2 Button „Inspiration Hold“
3 Button „Aerosol“
4 Toggle button „Day/Night“
5 Control knob „IGR“
6 Lock/Unlock touchscreen

Functional description

Button „Preoxy“
Press the „Preoxy“ button to administer a pre-adjustable inspiratory oxygen concentration for a certain preset interval. These settings can be configured in the „System Settings/Function“ menu. At the same time, the display of the set oxygen concentration changes to the pre-set „preoxy“ value. The alarm limits for oxygen concentration are adjusted automatically. The button is green while pre-oxygenation is in progress.

Button „Inspiration Hold“
Pressing this button during inspiration will hold inspiration at the end of the normal inspiration phase for the duration for which the button is pressed (maximum 15 s). Pressing the button during expiration will trigger a mandatory inspiration using the set ventilation parameters.

Button „Day/Night“ Toggle
This button lets you toggle the display, alarm indicator and patient/function buttons between day and night mode.

Functional description

Button „Aerosol“
Press the „Aerosol“ button to switch on aerosol nebulization. The medication nebulization duration can be set to between 5 and 30 min in the „System Settings/Function“ menu. The nebulization ends automatically at the end of the set time or when the button is pressed again. The button is green while nebulization is in progress.

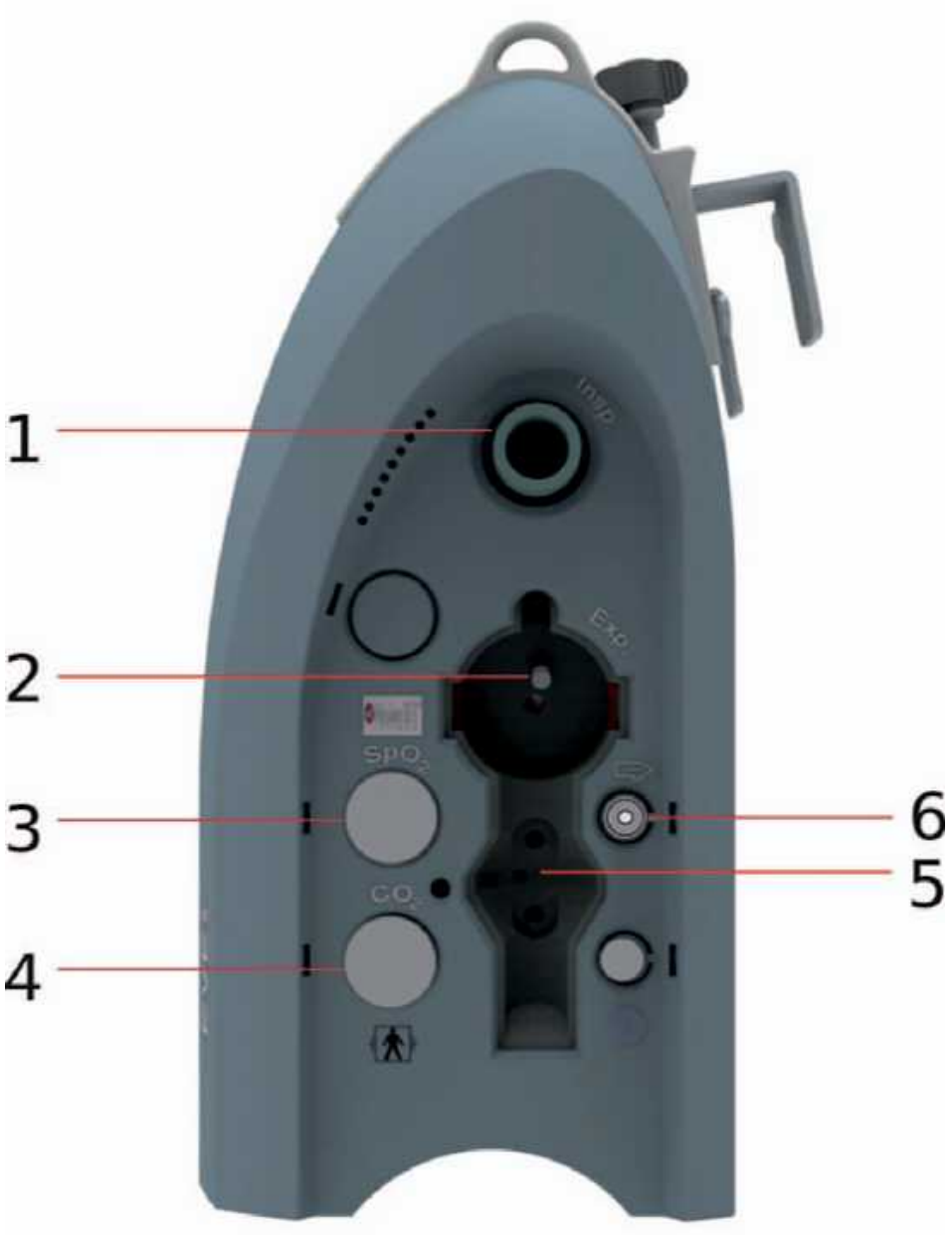
Aerosol nebulization is only possible if O_2 is connected to the ventilator.

Lock/Unlock Touchscreen
Pressing the control knob for three seconds will lock the touchscreen. Press the control knob again for three seconds to unlock the touchscreen. When you tap the locked touchscreen, a lock icon appears in the „System Settings“ field.

Control knob „IGR“
Use the control knob to select and activate all indirect functions.
The control knob has the following functions:

- Switching within the menus
- Selecting and executing menu functions
- Selecting and confirming parameter settings

Design and functional description



Right side view

1 Connection Inspiration tube

2 Connection Exspiration tube

3 Connection SpO_2 Sensor

4 Connection CO_2 Sensor

5 Connection Flow Sensor

6 Connection Aerosol nebulizer

Design and functional description

Rear view

1 Docking station interface

2 O_2 Sensor cover
⚠ Use only original Stephan O_2 sensors

3 Internal battery 1

4 External battery 2 (optional)

5 External battery charge level indicator
Lets you check the battery even when the device is switched off (LEDs).

6 Power supply input

7 Reset button
(no reset to factory settings)

8 Docking station bracket

9 Adjustable bracket

Preparation for use

To connect the oxygen cylinder:

- Fit the oxygen cylinder to the bracket on the mobile stand and secure.
- Connect the pressure regulator
- Connect the O_2 hose to the O_2 input on the left side of the EVE.
- Slowly open the valve and then slowly release it completely.

⚠ Note safety instructions

Changing the oxygen cylinder

- Hand-tighten the valve on the gas cylinder
- Drain any residual gas from the pressure regulator via the output until the pressure gauge on the pressure regulator shows „0“.
- Loosen the O_2 nist screw connector from the O_2 input
- Loosen the fastening buckles on the support frame and carefully remove the oxygen cylinder
- Remove the pressure regulator from the valve by turning the screw connector counter-clockwise and connect to the new cylinder
- Place the new cylinder in the support frame and close the fastening buckles
- Fit the O_2 nist screw connector to the O_2 input
- Open the pressurized gas cylinder‘s valve

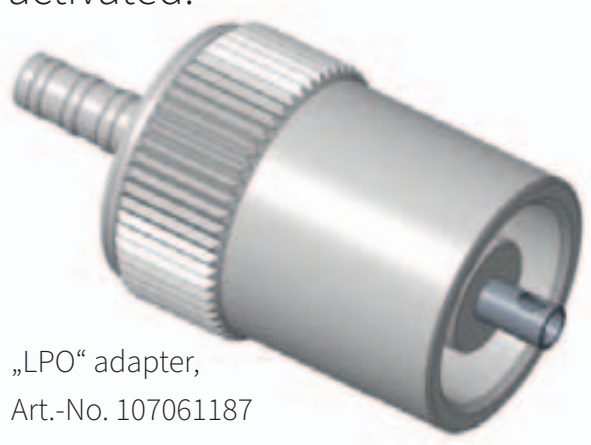
Preparation for use

Connection to the central gas supply

If the device is not operated with an oxygen source, it must be connected to the CGS. Connect the O_2 hose to the O_2 connector on the left side of the EVE and to the CGS wall outlet.

Connection to a low pressure oxygen concentrator

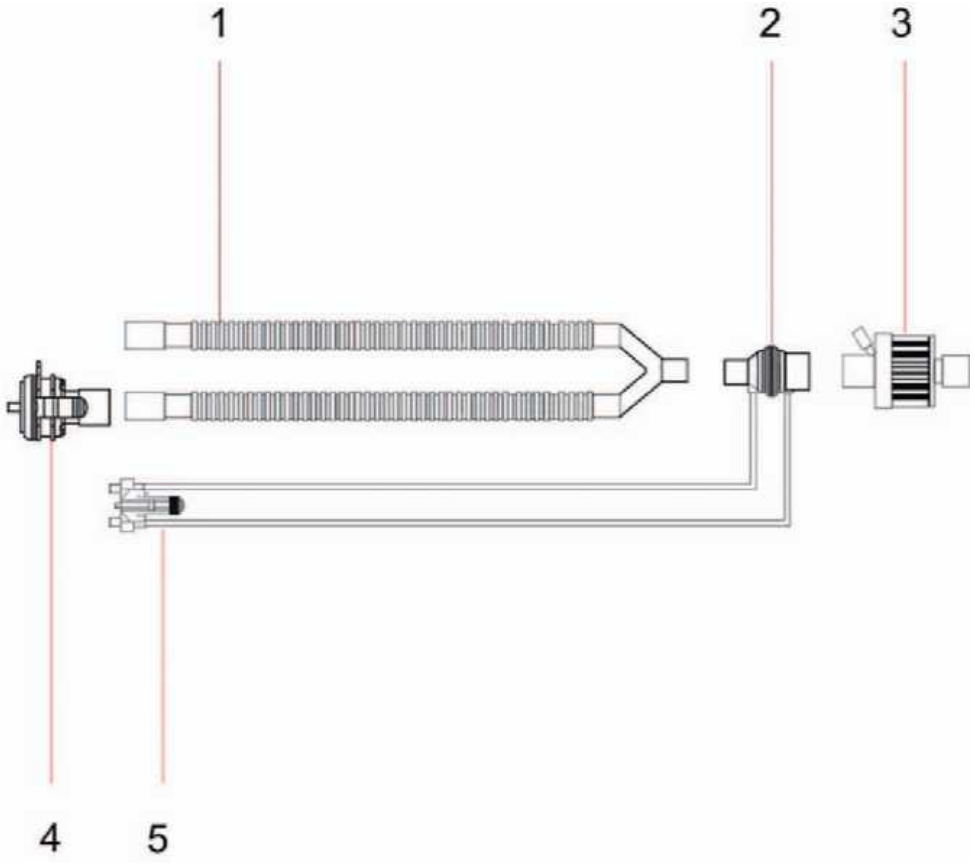
When using oxygen with a concentration of 93% an adapter must be screwed on to EVE‘s oxygen inlet and the „LPO“ option must be activated.



„LPO“ adapter,
Art.-No. 107061187

The input flow must be at least 3 l/min. The Fio_2 setting on the device is deactivated.
The oxygen concentration must be set on the concentrator.

Connecting the patient tube system



ICU disposable tube system

1 Dual tube system

2 Flow sensor for adults

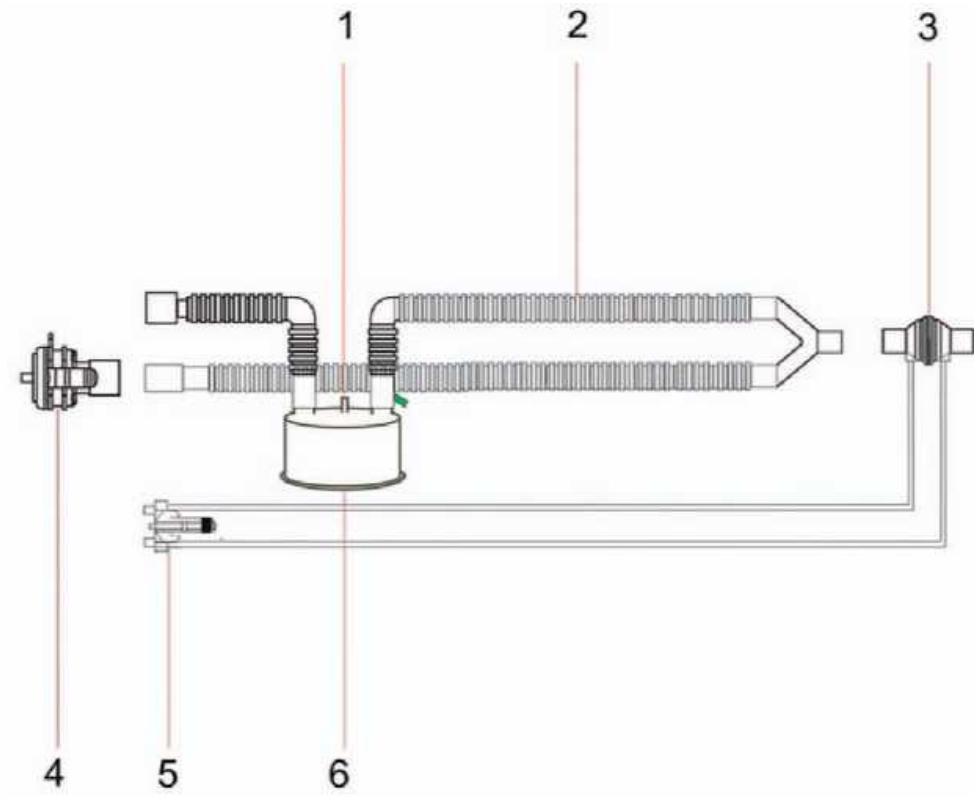
3 Patient filter (optional)

4 Distal expiration valve

5 Flow sensor adapter

⚠ Note safety instructions

Connecting the patient tube system



Disposable tube system with humidifier chamber

1 Humidifier chamber filling connection

2 Tube system

3 Flow sensor

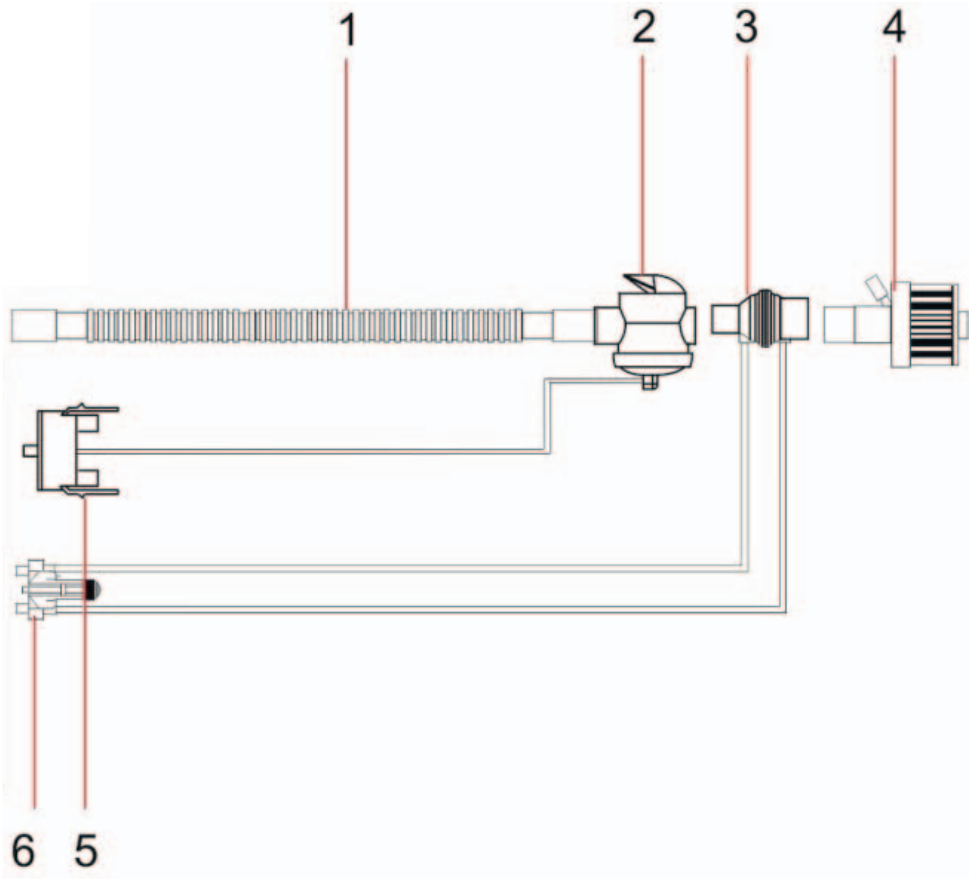
4 Distal expiration valve

5 Flow sensor adapter

6 Humidifier chamber

⚠ Note safety instructions

Connecting the patient tube system



Disposable tube system adults emergency

1 Tube system

2 Proximal expiration valve

3 Flow sensor for adults

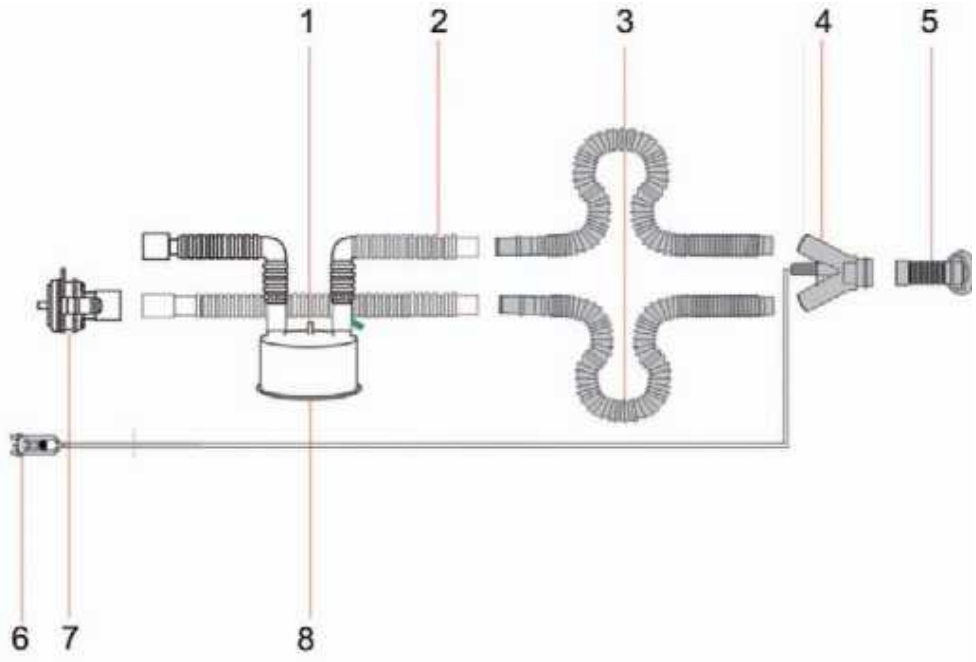
4 Patient filter (optional)

5 Expiration valve adapter

6 Flow sensor

⚠ Note safety instructions

Connecting the patient tube system

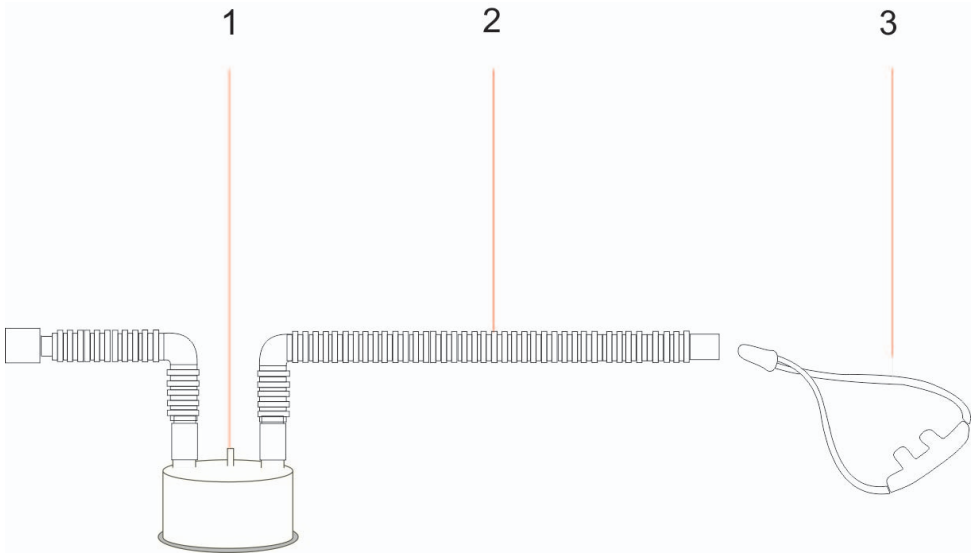


EasyFlow nCPAP-System

1 Humidifier chamber filling connection
2 Tube system
3 Decoupling tube
4 Applicator
5 Prong/mask
6 Flow sensor adapter
7 Distal expiration valve
8 Humidifier chamber

The pressure measuring adapter is not needed if an expiration valve with pressure measurement nozzle is used.

Connecting the patient tube system



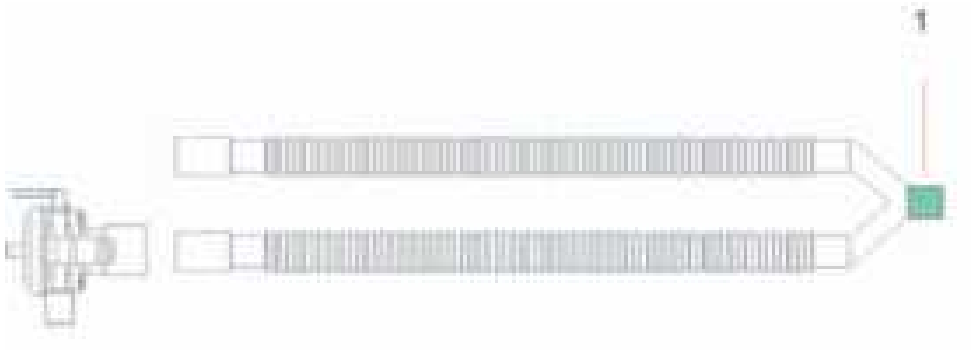
HighFlow-System

1 Humidifier chamber filling connection

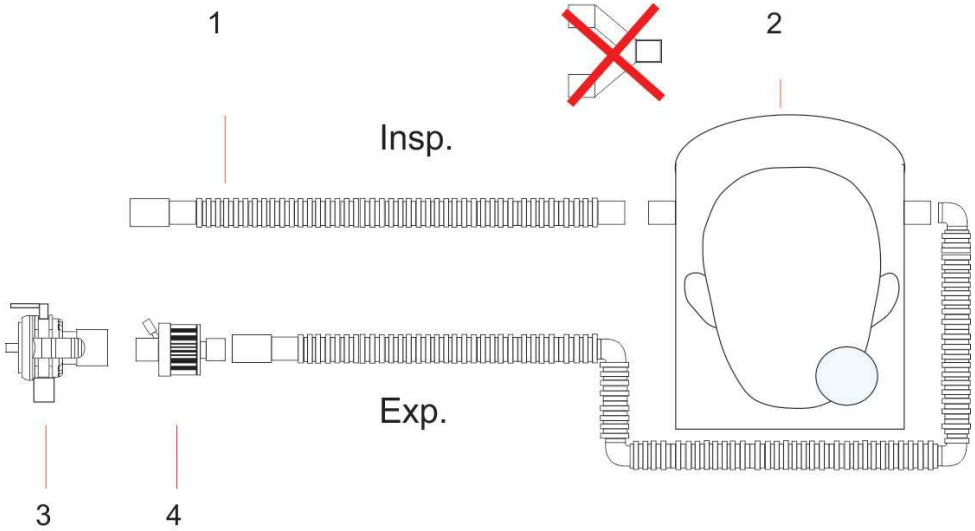
2 Tube system

3 HighFlow system

Connecting with ventilation helmet

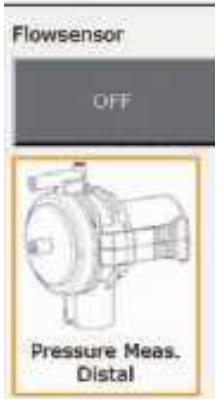


1 Start/Test EVE with double limb tube system (Art.-No. 107061203) and Y-piece



1 Double limb tube system
2 Ventilation helmet
3 Expiration valve with pressure measurement (Art.-No. 107061081)
4 Bacteriafilter

Connect patient and start ventilation



Settings:

Noninvasive ventilation (PC-CMV, PC-CPAP, PC-CPAP+ PSV)

Flow sensor off • Select Expiration valve with pressure measurement port

Installing the expiration valve

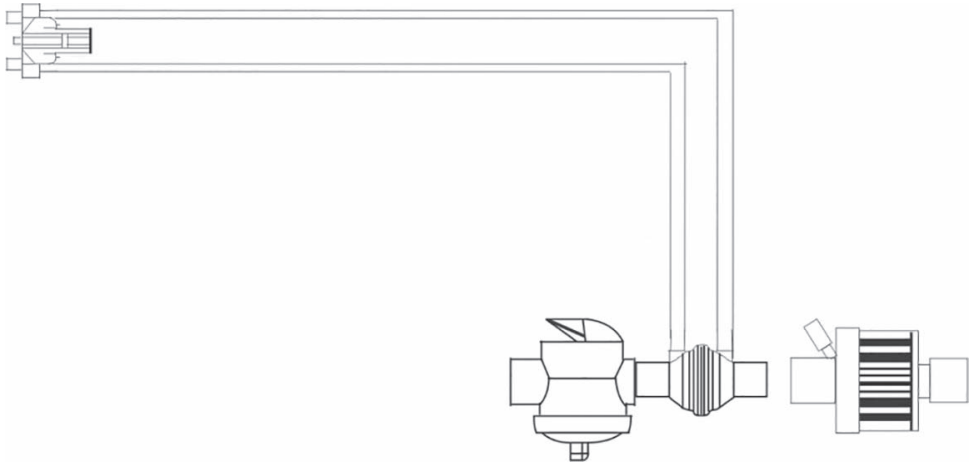
The EVE lets you use both distal (away from the patient) and proximal (close to the patient) expiration valves.

A proximal expiration valve is used only with the emergency hose system for adults.
The distal expiration valve is used for all other hose systems.

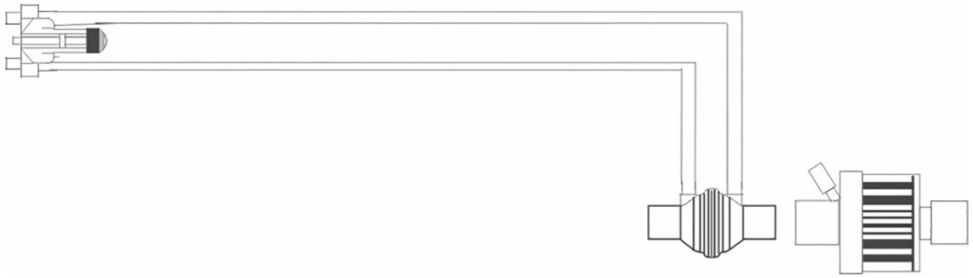
The distal expiration valve is connected directly to the expiration port and linked to the tube system.

⚠ Carefully insert the expiration valve in the corresponding connection on the right side panel and allow to engage.
Do not tilt the expiration valve or press it in with force. Danger of breakage!

Installing the flow sensor



Flow sensor connection with proximal expiration valve



Flow sensor connection with distal expiration valve

Turn the flow sensor measurement line connectors upward to prevent condensate from entering the measurement lines.

EVE measures pressure and flow via the flow sensor (PNT). The measurement is taken proximally between the Y-piece and the tube connector. For this purpose, a flow sensor head is fitted between the two parts.
The differential pressure resulting from the flow sensor head‘s resistor is a measure of the volume flow. Separate flow sensors are available for adults and children.
The flow sensor is connected between the expiration valve and the endotracheal tube (ETT). The images show the additional connection of a bacterial filter.

Ventilation mode display

This display indicates the current ventilation mode, the active additional functions, the patient type and the flow sensor type.
Selecting a non-invasive ventilation mode causes the display to turn orange. In addition, the icon for non-invasive ventilation appears.

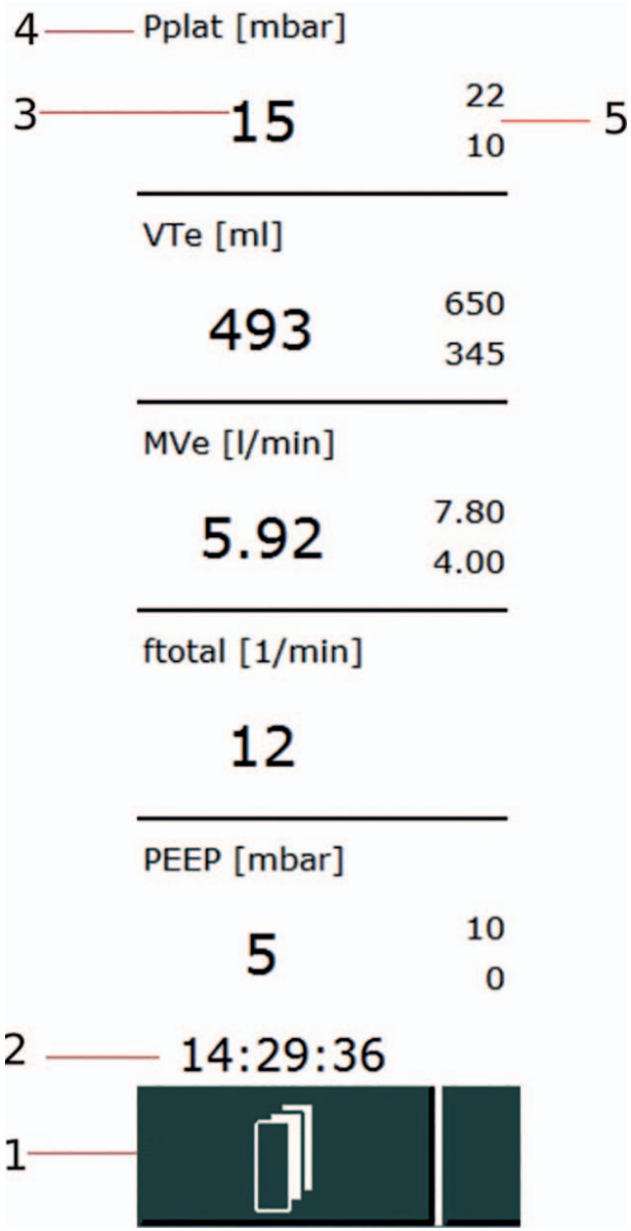
Invasive ventilation mode

Non-invasive ventilation mode

1 Flow sensor type
2 Icon for invasive ventilation
3 Additional function for ventilation mode
4 Ventilation mode
5 Patient type
6 Icon for non-invasive ventilation

Selecting this field opens a ventilation menu where you can adjust the settings to the current ventilation scenario.

Measured value display

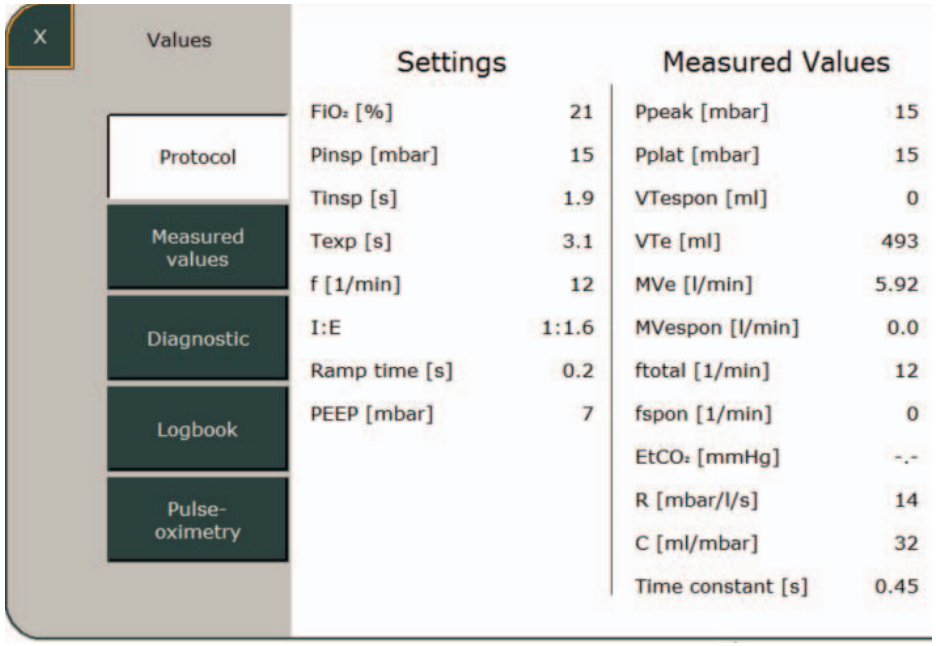


This display gives a quick view of the relevant measured values together with the alarm limits shown after the measured value.

1 Function field for toggling between the measured value display and the display of the active measured block
2 Time display
3 Measured value
4 Name of measured value including unit
5 Alarm limits display

Five measured values are displayed.
Three sets of 5 measured values each are available. Only one set can be displayed at a time. Use the function field to switch between the sets.

Function fields

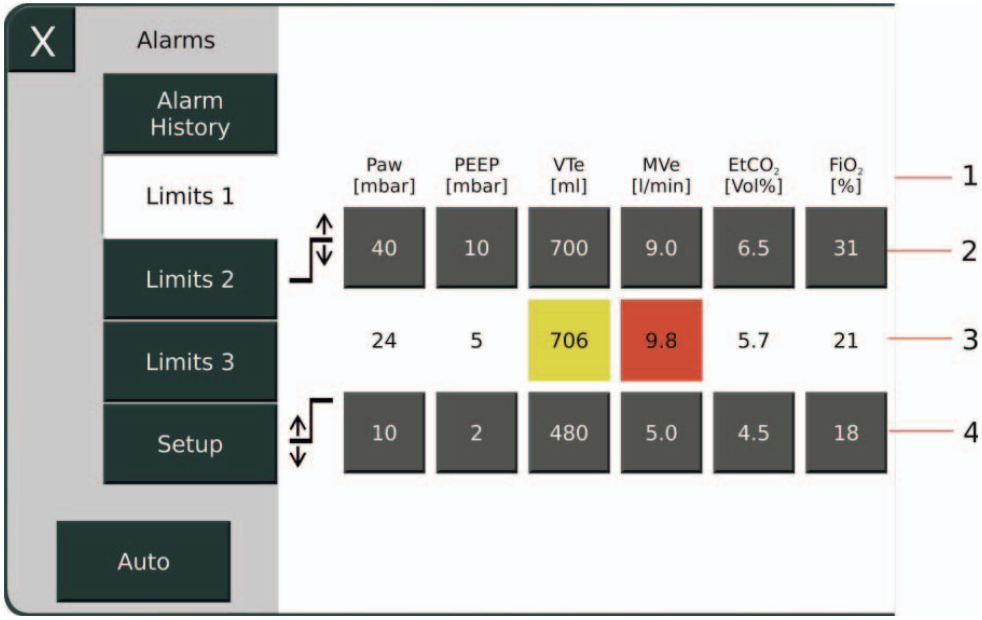


Values

Pressing this function field opens the „Values“ sub-menu.
This provides an overview of the measured values currently determined by the ventilator.

The logbook data can be saved on the internal SD card.

Function fields



Alarms

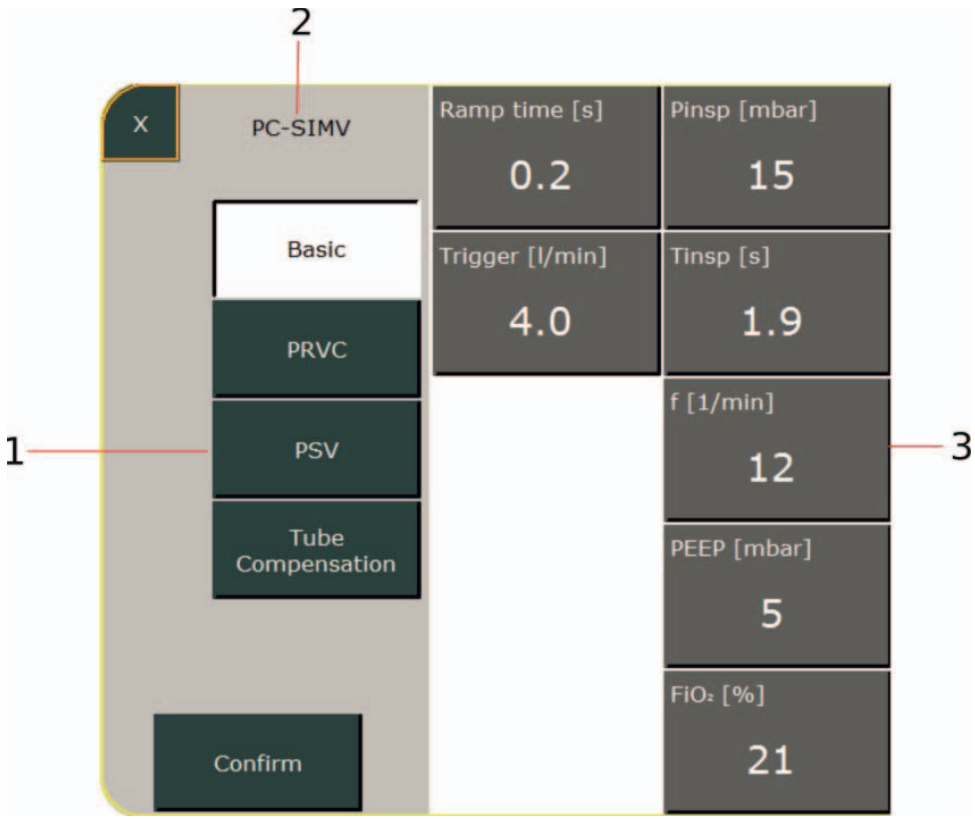
The „Alarms“ sub-menu shows the „Alarm History“ and all measured values that are monitored by alarm limits. Pressing the „Alarm History“ field or the alarm indicator opens a list of the seven most recent alarms.

Limits

Pressing the „Limits 1-3“ fields lets you view all the alarm limits and adjust them to the patient‘s needs. If limits are breached during the current ventilation, the corresponding parameter field turns yellow or red, depending on the alarm priority.

1 Name and unit
2 Upper limit
3 Current measured value
4 Lower limit

Parameters

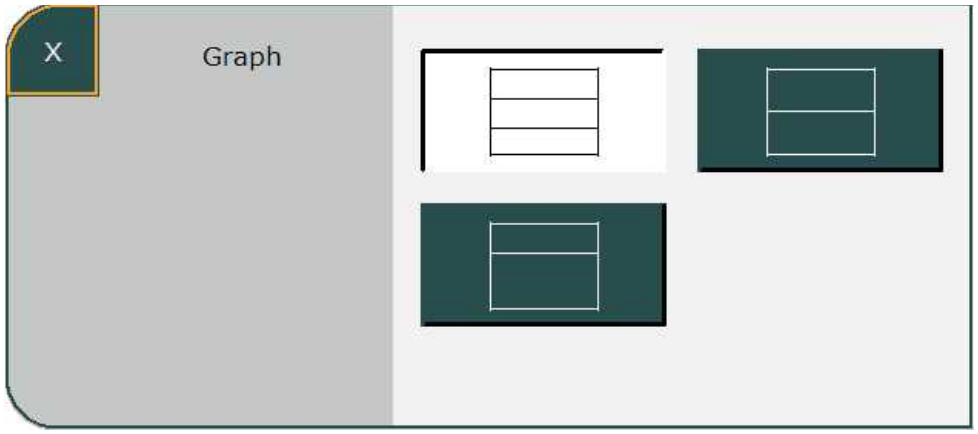


Pressing this function field opens a sub-menu with all configurable parameters and additional functions for the currently active ventilation mode.

1 Optionally selectable additional functions
2 Current ventilation mode indicator
3 Ventilation parameters

To change a parameter, select the corresponding field. The field then turns orange. You can now change the value using the control knob. If additional functions exist for the currently active ventilation mode, these can also be activated from this menu. Press the „Confirm“ field to save the new settings and close the sub-menu.

Graphic display

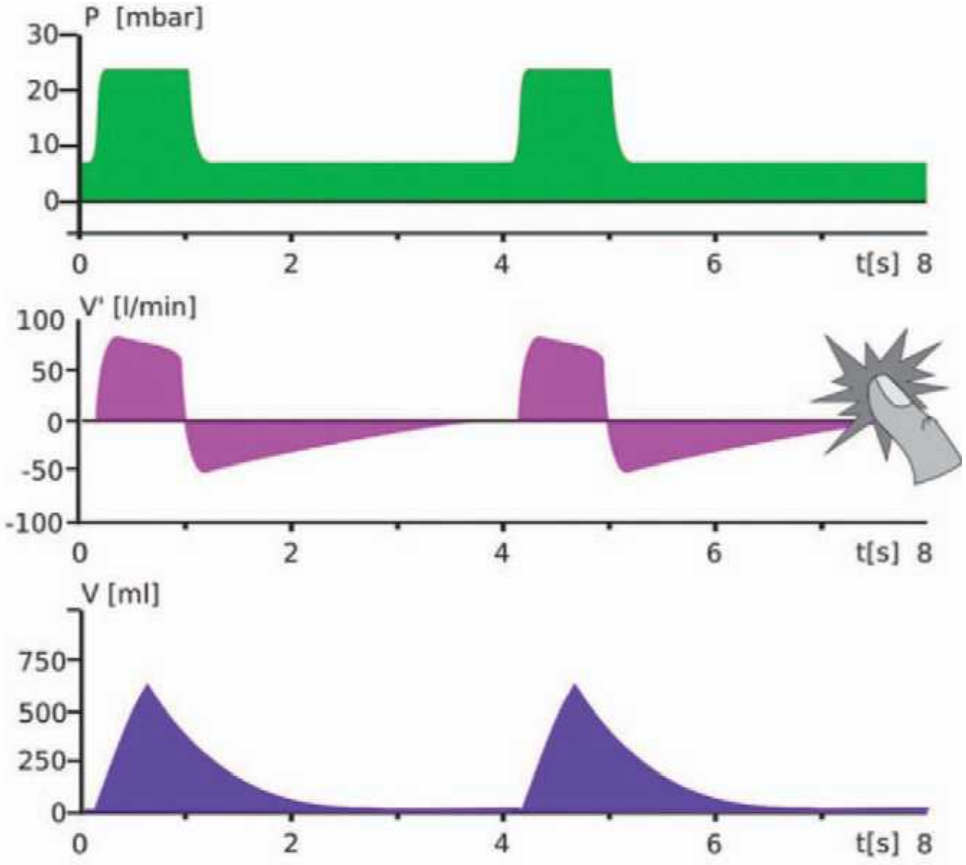


Pressing the „Graph“ button opens the graphic display, which can be customized. The initial layout can be pre-configured in the system settings. Three different layout versions are available.

1 Display of three curves
2 Display of two curves
3 Display of one curve, loop or trend

The top field of the graphic display always shows the pressure curve. The remaining fields can be freely configured by selecting them.

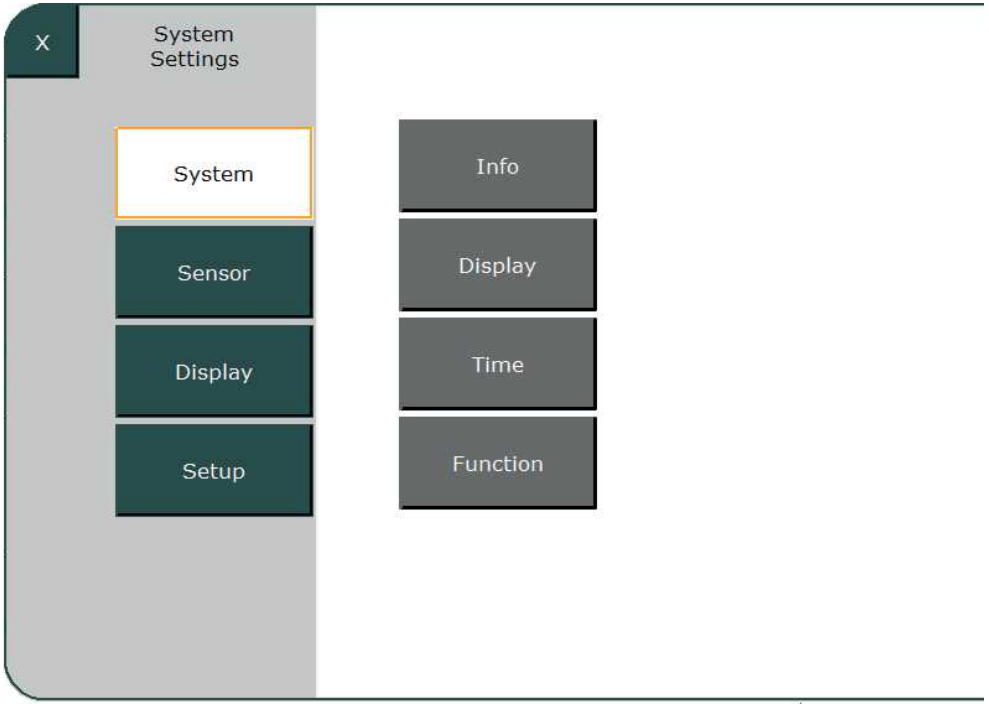
Configuring the measurement curves



Select a measurement curve on the display to change it. A window with all available measurement curves (volume, flow, CO_2 and plethysmogram) opens. You can now select the desired option. For a better view, the measurement curves can be frozen on the display. To do this, press the „Stop“ field in the selection window.

After activation, the measurement curves run until the end of the scale and are then frozen. This mode is ended by pressing the „Stop“ field or automatically after 20 s have passed.

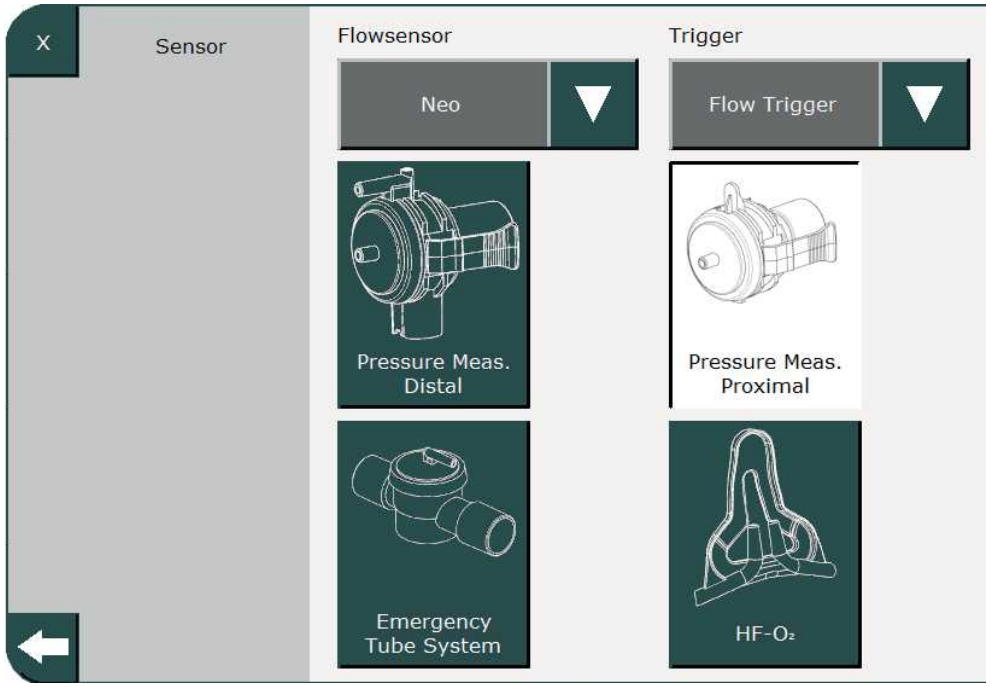
System settings



This lets you access the following sub-menus:

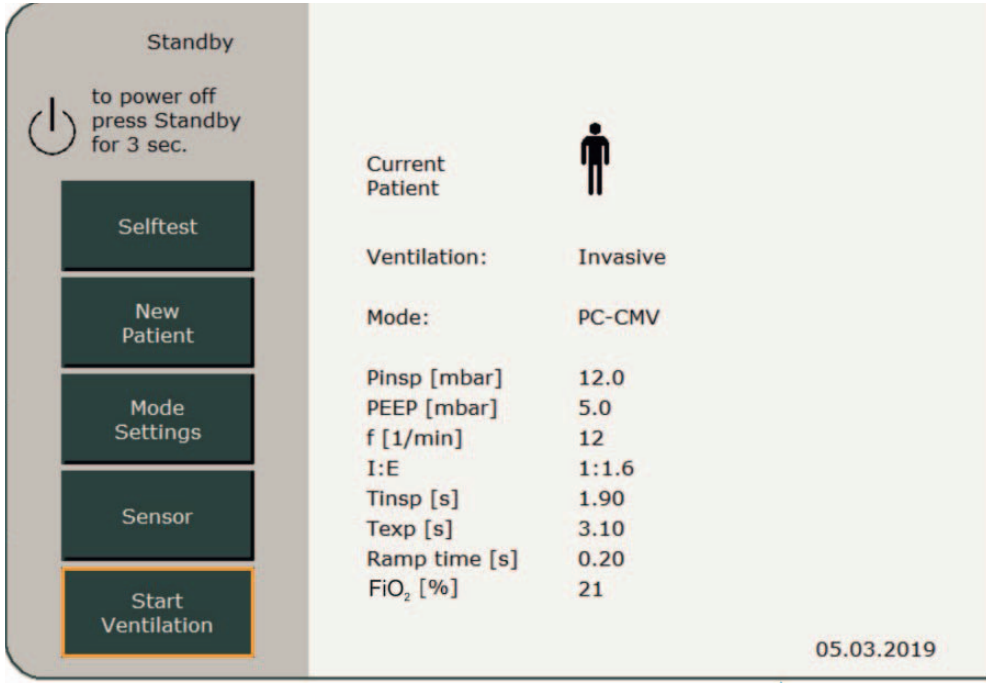
- Info
- Display
- Time
- Function

Flow



This sub-menu consists of functions to check and configure (as needed) the flow sensor and trigger. In addition, the following can be selected here: use of an expiration valve with either distal or proximal pressure measurement and use of either an emergency hose system or high flow nasal cannula for ventilation.

Standby mode

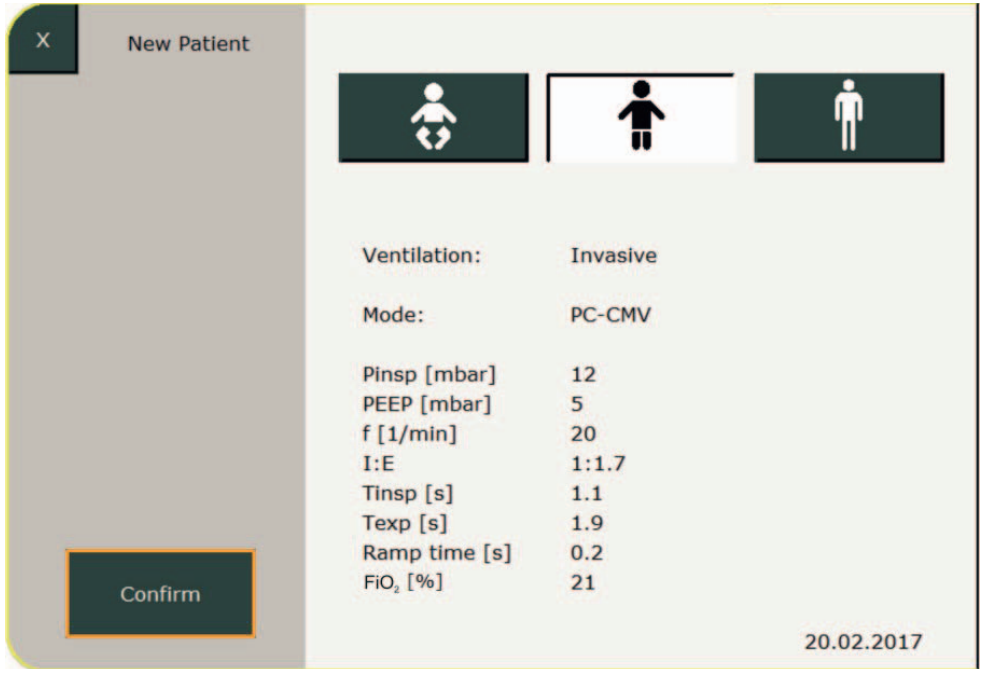


If the selftest is passed, the standby screen appears. Initially, it always shows the ventilation mode and settings for the most recent ventilated patient. To keep these settings, press the „Continue Ventilation“ field to activate ventilation.
Press the „New Patient“ field to create a new patient. To switch to Standby mode from a current ventilation process, press and hold the „On/Off/Standby“ button for 3 s.

Using fast tracking keys

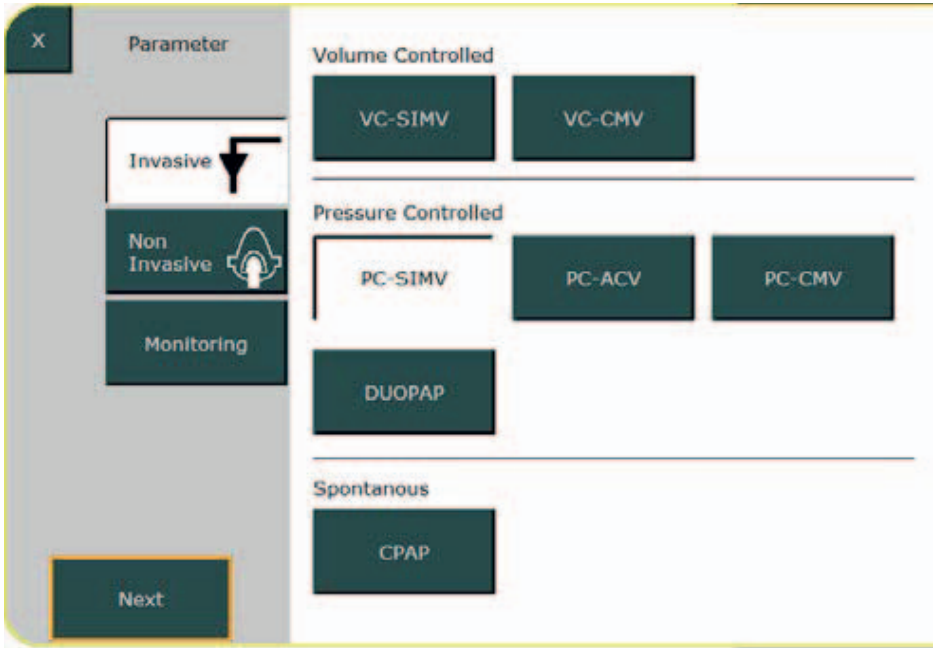
The easiest way to start a new ventilation process is by using the fast tracking keys on the front panel of the ventilator.
These provide a quick and easy way to select the default ventilation parameters for preterm infants and newborns, children and adults.
To prevent operator errors, the desired fast tracking key must initially be pressed for 0.5 s, after which it starts to flash green.
Pressing the key again for 0.5 s will then start or switch to the selected ventilation mode.
Fast tracking key assignment can be customized in the Setup menu.

New patient



This menu lets the user switch between settings for preterm infants and newborns, children and adults. This selection corresponds to the function of the fast tracking keys. After selecting the patient type, the system suggests pre-configured ventilation with ventilation parameters adapted to the corresponding patient type. Press the „Confirm“ button to save the settings and return the ventilator to the Standby screen.
You can now select the „Start Ventilation“ field. Press the „Mode Settings“ field to change the ventilation mode.

Ventilation settings



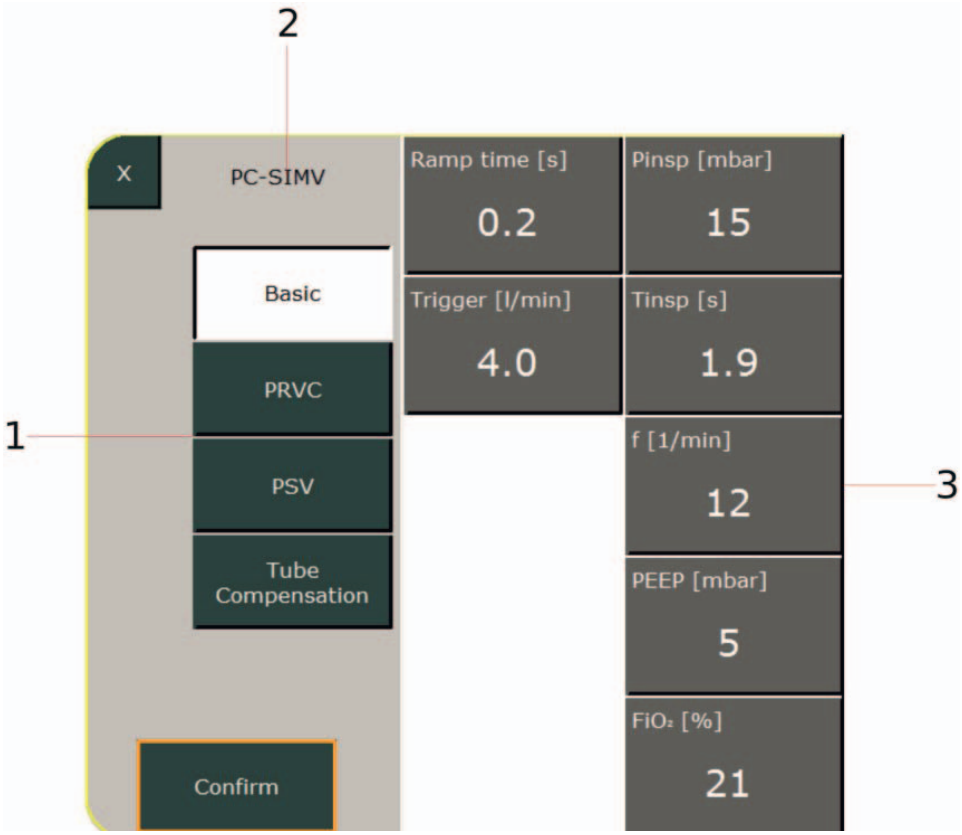
Selecting the ventilation mode

This example uses invasive PC-SIMV to describe the selection of the ventilation mode.

Proceed as follows: Press the „Invasive“ field in the menu. All available ventilation modes are displayed.

Select „PC-SIMV“ and press the „Next“ field.

Ventilation settings



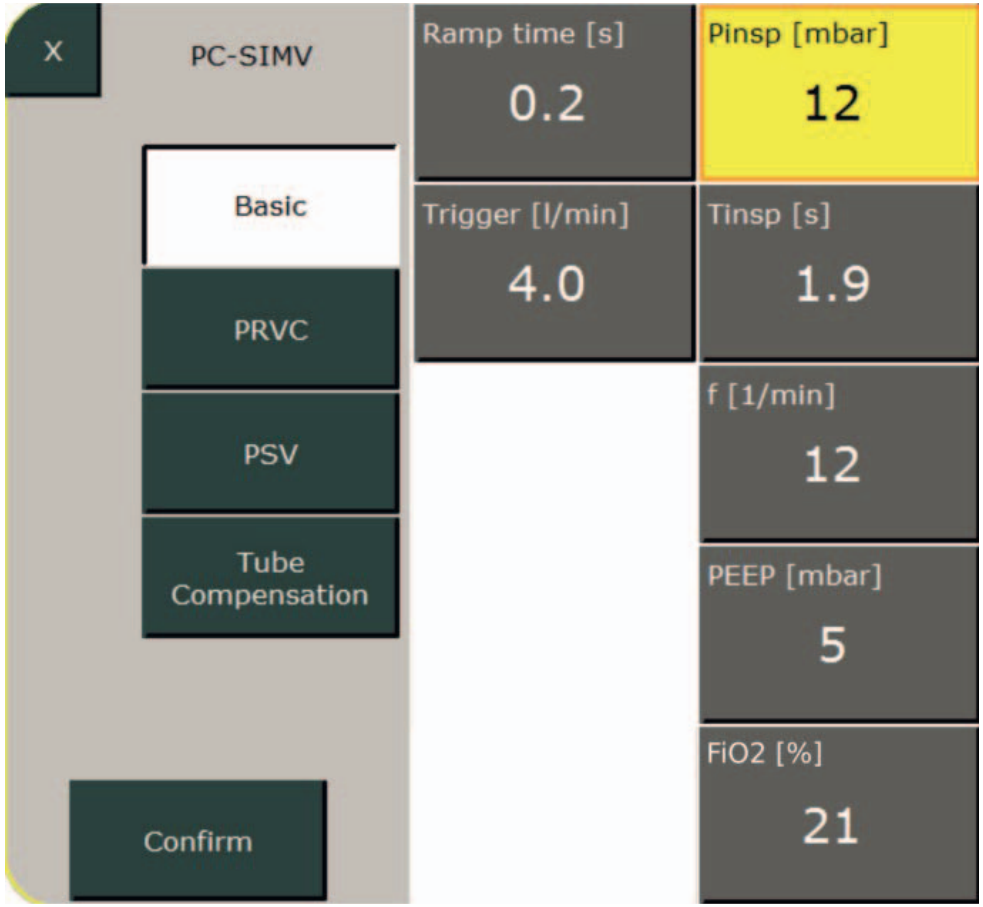
Parameters

The configuration menu for PC-SIMV opens.

1 Additional functions for the selected mode
2 Current ventilation mode
3 Configurable ventilation parameters

Possible additional options for PC-SIMV (here PRVC and PSV) and tube compensation are listed on the left side. The relevant configurable ventilation parameters are listed on the right side. After the user selects the desired PC-SIMV option, the corresponding ventilation parameters are displayed and can be adapted to the patient‘s needs.

Ventilation settings



Setting parameter

The selected parameter turns yellow.

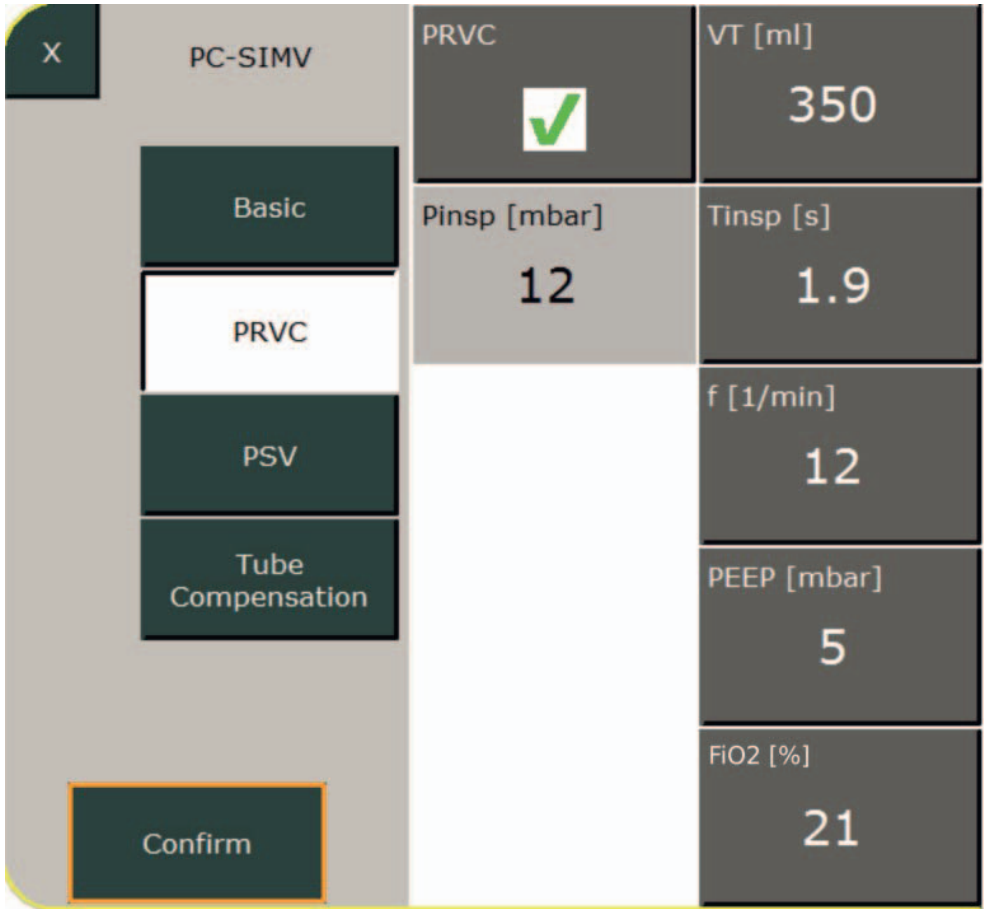
The value can now be changed using the control knob. Press the control knob or the „Confirm“ field to complete your entry.

Proceed analogously to configure the other ventilation parameters.

Press the „Confirm“ button to save the settings and return the ventilator to the „Standby“ menu.

Select „Continue Ventilation“ to activate the ventilation.

Ventilation settings

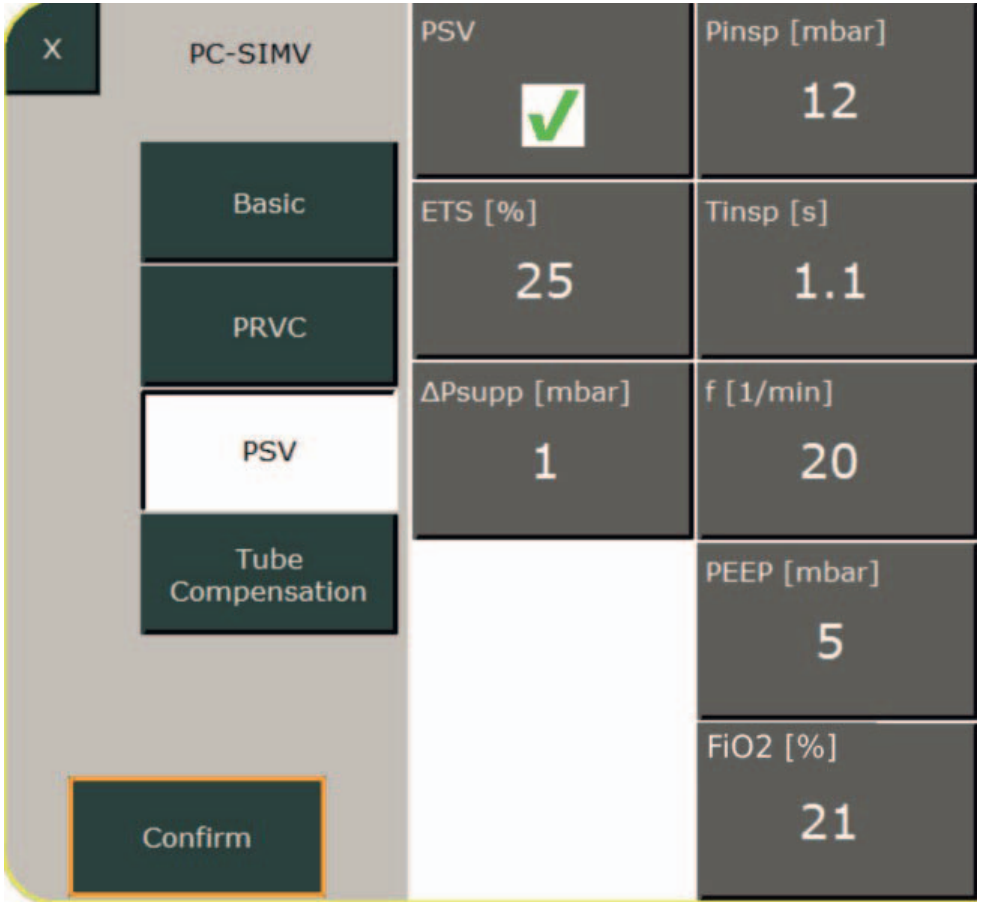


Setting parameter PRVC

This option lets the user select a target volume that guarantees a tidal volume with minimum required pressure during breaths. Depending on the patient‘s spontaneous breathing efforts and lung compliance, the inspiration pressure varies with the intention to apply the selected tidal volume with the minimum required pressure.

Increase the upper pressure alarm limit to e.g. 40 mbar to avoid pressure limitation.

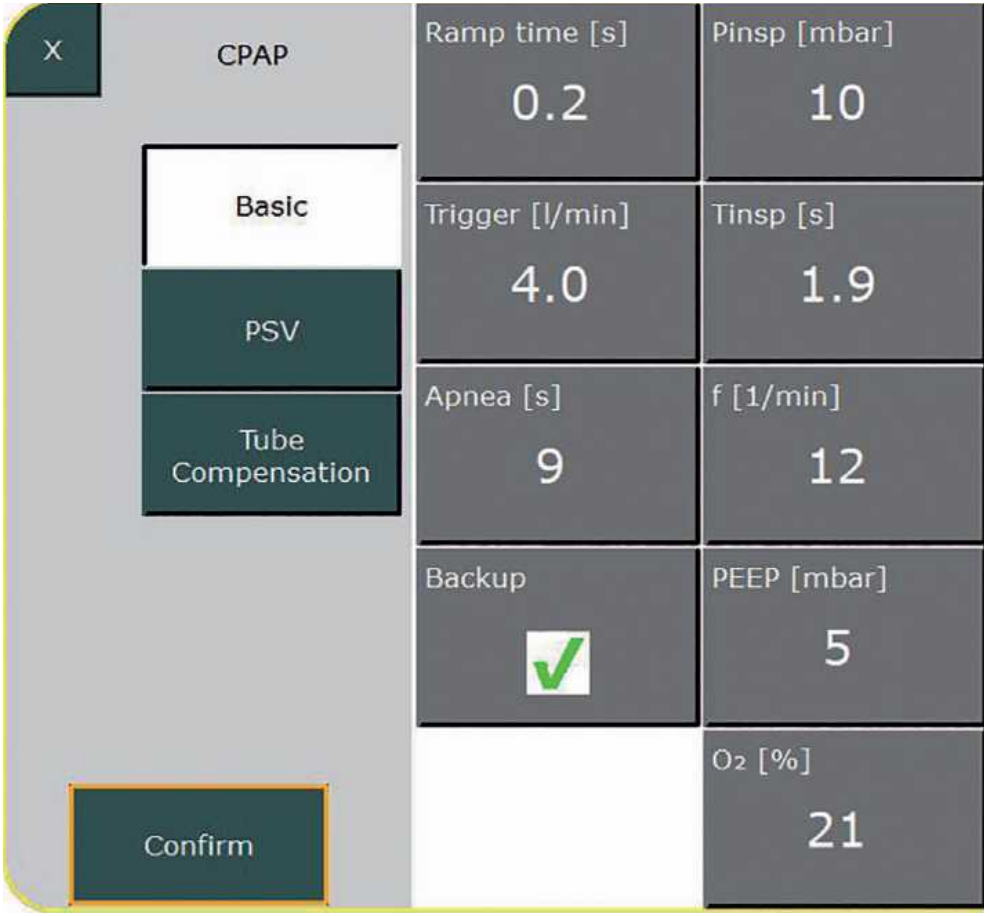
Ventilation settings



Setting parameter CPAP PSV

PSV is designed to support insufficient spontaneous breathing. It combines the benefits of pressure-controlled ventilation with the patient‘s spontaneous breathing activity. The ventilator uses the selected trigger threshold to detect the patient‘s inhalation efforts and then triggers a mandatory breath using the selected pressure support (ΔPsupp). With PSV enabled, the ventilator stores the inspiratory peak flow during inhalation. Expiration is initiated as soon as the flow has dropped to the previously set percentage for the inspiratory peak flow. The Expiration Trigger Sensitivity (ETS %) is used for this setting. In pure CPAP ventilation, the Pinsp setting acts as an parameter for Insp.-Hold.

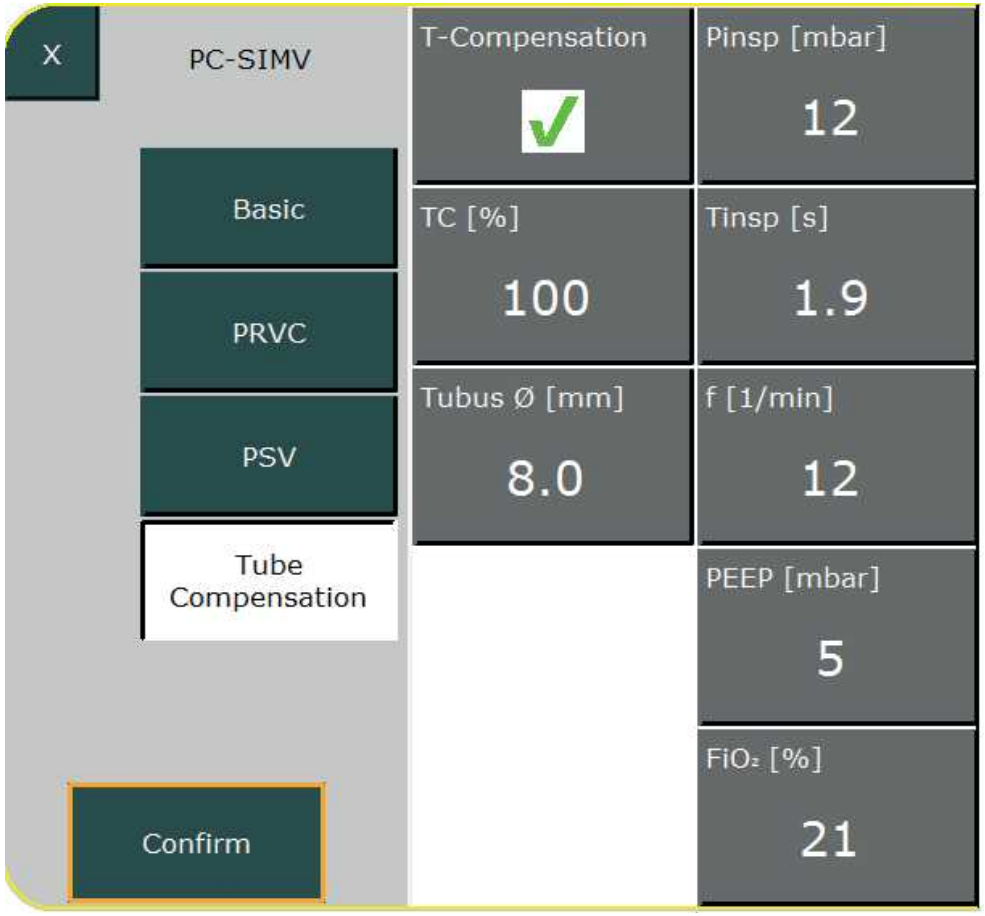
Ventilation settings



Parameter setting CPAP backup ventilation

CPAP can be combined with backup ventilation. The user can set the maximum desired apnea duration in the „Apnea“ field. If there is no spontaneous breathing during this time, the ventilator begins mandatory ventilation using the preset parameters.
The parameter settings for backup ventilation are comparable to PC-SIMV ventilation.

Ventilation settings



Tube compensation

All invasive ventilation modes can be combined with tube compensation.
This function lets you adjust the ventilation pressure to the resistance of the tracheal or endotracheal tube.

Adjustable parameters:

- Compensation (%)
- Tube diameter (mm)

Stop ventilation

To end the ongoing ventilation and switch to Standby mode, press and hold the „On/Off/Standby“ button for 3 s.
Pressing the button for another 3 s turns the ventilator off.

Fritz Stephan GmbH Medizintechnik · Kirchstraße 19 · 56412 Gackenbach · Germany
Tel. +49 6439-91 25-0 · Fax +49 6439-91 25-111 · info@stephan-gmbh.com · www.stephan-gmbh.com