Oxylog ® 3000

MT 153-2001

Emergency and transport ventilator
Instructions for Use
Software 1.n

Because you care

Working with these Instructions for Use

Header line -
the title of the main chapter...
for fast orientation and navigation.

Page body -
the instructions for the user...
combine text and illustrations. The information is presented as sequential steps of action, giving the user hands-on experience in learning how to use the device.

Left-hand column - the text...
provides explanations and instructs the user step-by-step in the practical use of the product, with short, clear instructions in easy-to-follow sequence.

● Bullet points indicate separate actions.
1 Where several actions are described, numbers are used both to refer to the relevant details in the illustrations. On each page the numbering restarts with "1".
— Dashes indicate the listing of data, options or objects.

Right-hand column - the illustrations...
provide visual reference for the text and for locating the various parts of the device. Elements mentioned in the text are highlighted. Unnecessary details are omitted. Renderings of screen images guide the user and allow to reconfirm actions performed.

Typing conventions in this manual
— Controls and screen pages are printed in bold within quotation marks, e.g. »**PEEP**« or »**Alarm Settings**«.

— Screen messages are printed in bold, e.g.
   Flow Calibration

— Alarm messages are shown including the exclamation marks indicating their alarm level e.g.
   Standby activated !!!

Registered Trademarks
The Dräger name and logo are registered trademarks of Dräger.
The Oxylog $^®$ 3000 name is a registered trademark of Dräger.

Trademark used under license
BIPAP is a trademark used under license agreement in existence with Respironics.

Definitions

WARNING!
A WARNING statement provides important information about a potentially hazardous situation which, if not avoided, could result in death or serious injury.

CAUTION!
A CAUTION statement provides important information about a potentially hazardous situation which, if not avoided, may result in minor or moderate injury to the user or patient or in damage to the equipment or other property.

NOTE
A NOTE provides additional information intended to avoid inconvenience during operation.

Abbreviations and Symbols
Please refer to "Abbreviations" on page 17 and "Symbols" on page 18 for explanations.

Contents

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For Your Safety and that of Your Patients

For Your Safety and that of Your Patients

Strictly follow these Instructions for Use

WARNING!
Strictly follow these Instructions for Use.
Any use of the product requires full under-standing and strict observation of all portions of these instructions. The device is only to be used for the purpose specified under "Intended Use" on page 10 and in conjunction with appropriate patient monitoring. Observe all WARNING and CAUTION statements throughout this manual and all statement on device labels.

Maintenance

WARNING!
The device must be inspected and serviced regularly by trained service personnel. Repair of the device may also only be carried out by trained service personnel.
Dräger recommends that a service contract be obtained with DrägerService and that all repairs also be carried out by them. Dräger recommends that only authentic Dräger repair parts be used for maintenance. Otherwise the correct functioning of the device may be compromised.
See chapter "Maintenance" on page 72.

Accessories

WARNING!
Only the accessories indicated on the list of accessories have been tested and approved to be used with the device. Accordingly it is strongly recommended that only these accessories be used in conjunction with the specific device. Otherwise the correct funtioning of the device may be compromised.

Not for use in areas of explosion hazard

WARNING!
This apparatus is neither approved nor certified for use in areas where combustible or explosive gas mixtures are likely to occur.

Safe connection with other electrical equipment

WARNING!
Electrical connections to equipment which is not listed in these Instructions for Use should only be made following consultation with the respective manufacturers.

Patients requiring ventilation

may find themselves in a critical situation if a malfunction develops in the device, or in the event of a power failure lasting several hours. For this reason:

WARNING!
Have an alternate source of ventilation available.

CAUTION!
Have a supply of external batteries available.

Restriction of Distribution

CAUTION!
Device for use in health care facilities only and exclusively by persons with specific training and experience in its use.

Dräger Medical b.v., Best, The Netherlands

General WARNINGS and CAUTIONS

The following WARNINGS and CAUTIONS apply to general operation of the device. WARNINGS and CAUTIONS specific to subsystems or particular features appear with those topics in later sections of the manual.

WARNING!
Strictly follow Operators Instruction Manual!
The use of this product requires full understanding and strict observation of all portions of this Operating Instructions Manual. The equipment is only to be used for the purpose specified under "Intended Use" page 10. Observe all WARNINGS and CAUTIONS as rendered throughout this manual and on labels on the equipment.

WARNING!
Ventilation monitoring is mandatory at all times! Whenever a patient is connected to the ventilator, constant attention by qualified medical staff is required in order to provide immediate corrective action in case of a malfunction.

The operator shall not rely on the built-in monitoring of the ventilator and must always assume full responsibility for proper ventilation and patient safety in all situations.

WARNING!
Keep manual resuscitation bag ready at hand! If a failure is detected in the ventilator and its life-support functions can no longer be guaranteed (e.g. in case of a power failure or interruption in the medical gas supply), ventilation must be started without delay with an independent ventilation device (resuscitation bag) - using PEEP and/ or increased inspiratory O_2 concentration as necessary.

WARNING!
Always use officially approved gas cylinders and pressure regulators that comply with all applicable federal, state and local regulations.

WARNING!
To ensure proper ventilation, always consider the dead space of the total ventilation circuit when setting ventilation parameters, especially for small tidal volumes.

WARNING!
Do not use the equipment in conjunction with magnetic resonance imaging (MRI, NMR, NMI). The apparatus may malfunction, causing danger to the patient.

WARNING!
The Oxylog 3000 ventilator must only be used under the supervision of qualified medical personnel in order to provide immediate corrective action in case of a malfunction.

WARNING!
Do not use the equipment in hyperbaric chambers! The apparatus may malfunction, causing danger to the patient.

WARNING!
Do not use the device outside the specified environmental and supply conditions as the device might not operate according to its specifications and might even become inoperative.

CAUTION!
In order to ensure proper functioning of the device only use accessories listed in the Order List page 101.

Note on EMC/ESD risk for the device function

General information on electromagnetic compatibility (EMC) persuant to the international EMC standard IEC 60601-1-2: 2001

Electromedical devices are subject to special precautionary measures concerning electromagnetic compatibility (EMC) and must be installed and put into operation in accordance with the EMC information included in the technical documentation which is available from DrägerService on request.

Portable and mobile RF communications equipment can affect medical electrical equipment.

WARNING!

Connector pins with an ESD warning sign should not be touched and no connections should be made between these connectors without implementing ESD protective mesaures. Such precautionary procedures may include antistatic clothing and shoes, the touch of a ground stud before and during connecting the pins or the use of electrically isolating and antistatic gloves. All staff involved in the above shall receive instruction in these ESD precautionary procedures.

Intended Use

Intended Use

Intended medical applications

Oxylog$^®$ 3000 is a time-cycled, volume-constant and pressure-controlled emergency and transport ventilator for patients with a tidal volume from 50 mL upwards.

Available ventilation modes

— CMV/CMVAssist[*]
Intermittent Positive Pressure Ventilation
Controlled and assisted volume-constant ventilation with PEEP for CPPV.
— SIMV/PS
Synchronized Intermittent Mandatory Ventilation
Procedure for weaning patients off the ventilator after they have started spontaneous breathing, with adjustable pressure assist during spontaneous breathing.
— CPAP/PS
Continuous Positive Airway Pressure
Spontaneous breathing with positive airway pressure and adjustable pressure assist.
— PCV+/PS[*]
Biphasic Positive Airway Pressure
Pressure-controlled ventilation combined with free spontaneous breathing during the complete breathing cycle, and adjustable pressure assist on CPAP level.

Special modes

— Apnea Ventilation
For switching over automatically to volume-controlled mandatory ventilation, if breathing stops.
— NIV
Non-invasive ventilation for mask ventilation with leakage compensation.

For O2 inhalation

– with inhalation mask

With monitoring

— Airway pressure Paw
— Expiratory minute volume MV
— Apnea
— Rapid shallow breathing: High frequency alarm

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[*] CMV **C**ontrolled **M**andatory **V**entilation
PCV+ **P**ressure **C**ontrolled **V**entilation plus
PS **P**ressure **S**upport

Areas of use

Mobile use for emergency medical care or primary care of emergency patients:
— During transport in emergency rescue vehicles or aircraft including helicopters,
— In accident and emergency departments, in the recovery room.

Mobile use for secondary transfers:
— During transfer by road or air
— When moving ventilated patients around the hospital.

These Operating Instructions describe the maximum equipment configuration for Oxylog $^®$ 3000.
Depending on the actual configuration used, the configuration may not include the following options:
— O2 inhalation
— 100 % O2

Restrictions of Use

WARNING!
The Oxylog 3000 ventilator must only be used under the supervision of qualified medical personnel in order to provide immediate corrective action in case of a malfunction.

WARNING!
Whenever a patient is connected to the ventilator, constant attention by qualified medical staff is required in order to provide immediate corrective action in case of a malfunction.

WARNING!
Do not use the equipment in hyperbaric chambers!
The apparatus may malfunction, causing danger to the patient.

WARNING!
Do not use the equipment in conjunction with magnetic resonance imaging (MRI, NMR, NMI).
The apparatus may malfunction, causing danger to the patient.

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What is what

What is what

Front panel with all options

1   Screen with screen pages for the specific application

2   Key »**Alarms** ▷▷ « for setting and displaying alarm limits

3   Key »**Settings** ▷▷ « for setting other ventilation parameters on the screen

4   Key for ventilation modes **CPAP, CPAP/ASB** (CPAP/PS)

5   Key for ventilation modes **IPPV** (CMV)**, IPPVAssist** (CMVAssist)

6   Key for ventilation modes **SIMV, SIMV/ASB** (SIMV/PS)

7   Key for ventilation modes **BIPAP** (PCV+)**, BIPAP/ASB** (PCV+/PS)

8   Red and yellow lamps as alarm indicators

9   Key » 🔕 « or muting the alarm tone for 2 minutes

10 Key »**Alarm Reset**« for acknowledging alarm messages

11 Key »**O2-Inhalat.**« for changing over to O_2 inhalation or key »**100 % O2**« for oxygenation

12 Key »**Insp. hold**« for manual inspiration

13 Key » ⏻ « for switching the ventilator ON/OFF

14 Display symbols for the power supply
    🔋 Status indicator of the internal battery
    ⊡ Mains power supply connected

15 Central rotary knob for making selections / settings and for confirming these

16 Control knob for setting the O_2 concentration »**O2**« to 40 % or 100 %

17 Control knob for setting the maximum inspiratory pressure »**Pmax**«

18 Control knob for setting the ventilation frequency »**Freq**.«

19 Control knob for setting the tidal volume »**VT**«

20 Key »**Curves** « for zooming the curve display and changing over between displayed "Flow" and "Paw" curves

21 Key »**Values** ▷▷ « for displaying measured values

Side view, right

1 Emergency air intake
2 Screw for securing the battery compartment cover
3 Sockets for flow measuring hoses
4 Socket for ventilation hose
5 Connector for medical gas hose
6 Socket for DC supply
7 Window for IrDA interface

⚠ Note Instructions for Use

CAUTION!
Do not block emergency air intake. This may result in ventilator malfunction.
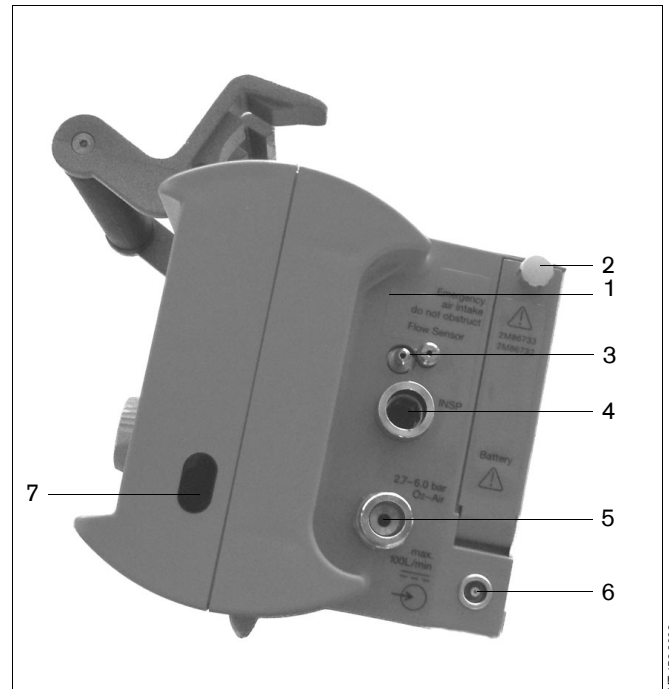
Rear view

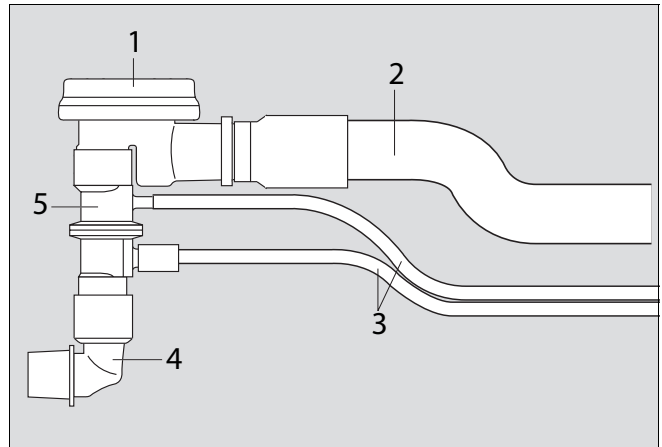**8** Filter cartridge for intake of ambient air
9 Rating plate

CAUTION!
Do not block air intake. This may result in ventilator malfunction.

Reusable hose set

1 Breathing valve
2 Ventilation hose
3 Flow measuring hoses
4 Angled connector
5 Flow sensor

Disposable hose set

1 Breathing valve
2 Ventilation hose
3 Flow measuring hoses
4 Angled connector
5 Flow sensor
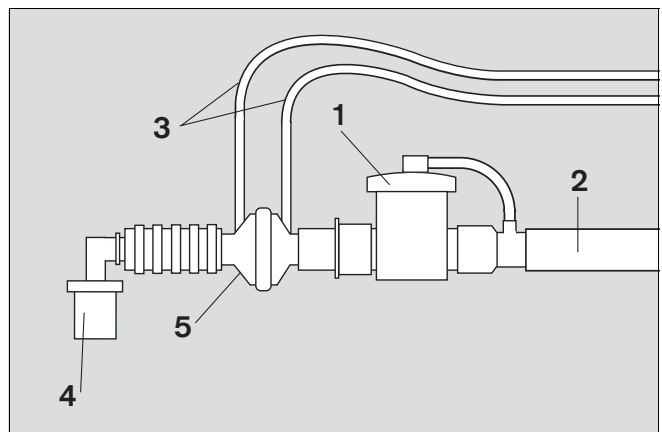
Abbreviations

Abbreviation	Explanation
ASB (PS)	**A**ssisted **S**pontaneous **B**reathing Pressure-assisted spontaneous breathing
BIPAP (PCV+)	**B**iphasic **P**ositive **A**irway **P**ressure Spontaneous breathing with continuous positive airway pressure and two different pressure levels
BIPAP/ASB (PCV+/PS)	**B**iphasic **P**ositive **A**irway **P**ressure **A**ssisted **S**pontaneous **B**reathing Pressure-controlled ventilation in combination with spontaneous breathing throughout the breathing cycle and with variable pressure support at CPAP level
bpm	**b**reaths **p**er **m**inute (in customer mode)
BTPS	**B**ody **T**emperature, **P**ressure **S**aturated Measured values referred to the conditions of the patient's lung, body temperature 37 $^{\circ}$C, ambient pressure, water-vapour-saturated gas
C	Compliance
CMV	**C**ontrolled **M**andatory **V**entilation
CMV$_{Assist}$	**C**ontrolled **M**andatory **V**entilation **As**sisted
CPAP	**C**ontinuous **P**ositive **A**irway **P**ressure Spontaneous breathing with continuous positive pressure
CPAP/ASB (CPAP/PS)	**C**ontinuous **P**ositive **A**irway **P**ressure **A**ssisted **S**pontaneous **B**reathing Spontaneous breathing at an elevated pressure level
EN 794-3	European standard for medical ventilators, Part 3 "Emergency and transport ventilators"
∆ ASB (∆ PS)	Set value for pressure support ASB – ∆ ASB over PEEP
f	Ventilation frequency
f$_{Apnoea}$	Frequency of apnoea ventilation
FiO$_2$	Inspiratory oxygen concentration
Freq.	Ventilation frequency
f$_{spn}$	Spontaneous breathing rate
IPPV (CMV)	**I**ntermittent **P**ositive **P**ressure **V**entilation
IPPV$_{Assist}$	**A**ssisted **I**ntermittent **P**ositive **P**ressure **V**entilation
I:E	Ratio inspiration time : expiration time

Abbreviation	Explanation
MV	Minute volume
MVspn	Proportion of the minute volume which is accounted for by spontaneous breathing
NIV	Non-invasive ventilation – mask ventilation
O$_2$	Set value for the inspiratory O$_2$ concentration
O$_{2\text{-Inhalat.}}$	O$_2$ inhalation
Paw	Airway pressure
PCV+	**P**ressure **C**ontrolled **V**entilation plus
PEEP	Positive end expiratory pressure
P$_{insp}$	Set value of the upper pressure level in BIPAP
Pmax	Maximum airway pressure
Pmean	Mean airway pressure
Ppeak	Maximum airway pressure
Pplat	End inspiratory airway pressure
PS	**P**ressure **S**upport, pressure assisted spontaneous breathing
R	Resistance
Ramp	Set value for the rise in pressure over time for pressure assistance with ASB
SIMV	**S**ynchronized **I**ntermittent **M**andatory **V**entilation
SIMV/ASB (SIMV/PS)	**S**ynchronized **I**ntermittent **M**andatory **V**entilation / **A**ssisted **S**pontaneous **B**reathing - Ventilation can be supplemented with ASB
T$_{Apnoea}$	Apnoea alarm time
T$_e$	Expiration time
T$_{insp}$	Set inspiration time
T$_{plat}$	Plateau time
VT$_{Apnoea}$	Tidal volume of apnoea ventilation
V$_T$	Set tidal volume
V$_{Te}$	Exp. Tidal volume
V$_{Ti}$	Insp. Tidal volume
100 % O$_2$	100 % O$_2$ flow

Symbols

| Symbol	Explanation	Symbol	Explanation
[Insp. hold]	Inspiration is started and held manually	⌷	Do not dispose of the device as municipal waste, but dispose of at municipal collection points for waste electrical and electronic equipment.
[Settings ▷▷]	Display screen window "Settings"		
[Alarms ▷▷]	Display screen window "Alarms"		Manufacturing date
[Values ▷▷]	Display screen window "Measured values"		Manufacturer
[Curves]	Changeover between flow/pressure curve	→⊖	DC input
[⧄]	Suppress acoustic alarm for 2 minutes		
[Alarm Reset]	Acknowledge alarms		
⏻	Standby/Operation switch		
⌐▲	Lower and upper alarm limits		
⌐▲	Upper alarm limit only		
▼⌐	Lower alarm limit only		
!	Advisory message		
!!	Caution message		
!!!	Warning		
⚠	Strictly follow the Instructions for Use!		
⧊	Type BF applied part (body floating)		
⊟	Battery status: charging (orange) or full (green)		
⊐	External power supply connected		
▮▮▯▯	Battery charge (example: half full)		
(E 4) 10 R-02 0296	The device complies with UN Regulation nr. 10, revision 2 with respect to EMC for use in motor vehicles.		
IPX4	Device protected from water sprayed from all directions, limited entrance allowed.		
⧈	Class II equipment, device protected against electric shock with additional safety precautions such as double or reinforced insulations, without protective earthing.		

Operating concept

Operating concept

Key for switching on/off

1 To switch on, briefly press the »⏻« key.

1 To switch off, hold down the »⏻« key for about 3 seconds and

2 confirm the switch-off prompt = press rotary knob.

-
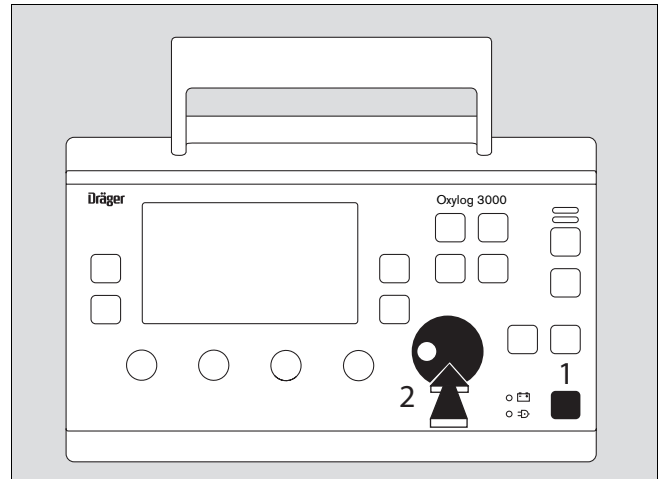
Ventilation Controls

3 Keys for selecting the ventilation modes:
– **IPPV (CMV), SIMV, CPAP**
– **BIPAP/ASB (PCV+/PS)**
– **SIMV/ASB (SIMV/PS)**
– **CPAP/ASB (CPAP/PS)**

The operating concept takes into account the various purposes for which the ventilator is used.

For primary care
When configured accordingly, Oxylog 3000 starts in IPPV ventilation mode with user-configured starting values for I:E (1:1.5 as default setting) and PEEP (5 mbar as default setting).

The most important ventilation parameters are set with the aid of the controls below the screen:

4 – Tidal volume **V**$_T$ [mL],
– Ventilation frequency **Freq**. [1/min],
– Max. inspiratory pressure **Pmax** [mbar],
– O$_2$ concentration **O2** [%].
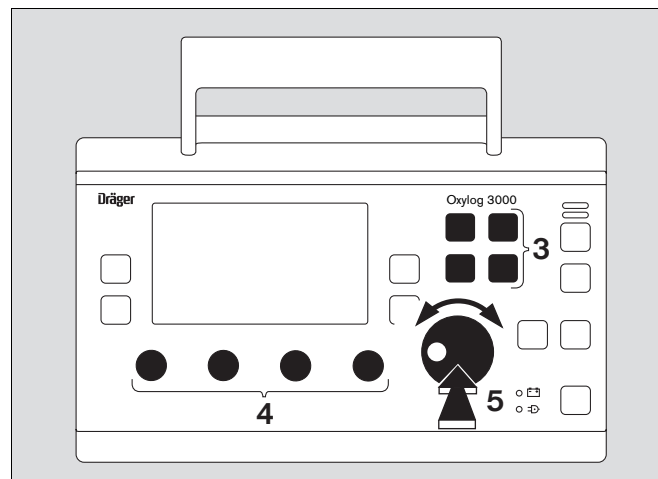
During secondary transfers
different ventilation modes and their parameters can be set in the screen window via the central rotary knob when selected accordingly (e.g. T$_{insp}$**, PEEP, △ ASB, P**$_{insp}$**).**

5 To select parameter : turn rotary knob
To activate parameter : press rotary knob
To set value : turn rotary knob
To confirm value : press rotary knob

Selecting the ventilation mode

1 Hold down the appropriate key for the ventilation mode for about 3 seconds
or
1 press the appropriate key briefly and
2 confirm. The selected ventilation mode will now be activated.
3 The actual ventilation mode is displayed in the top left-hand corner of the screen.
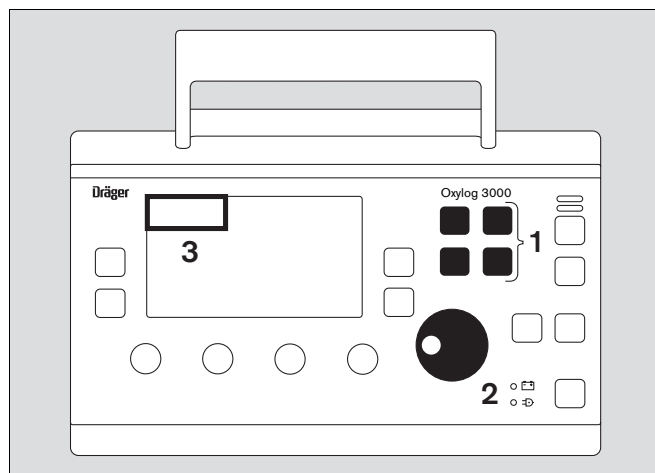For detailed instructions on setting the ventilation modes, see pages 42 onwards.

Keys for routine and additional functions

Frequently used keys for routine functions are positioned on the right-hand side of the front panel:

4 » ⌀ « key for suppressing the audible alarm tone for 2 minutes.
5 »**Alarm Reset**« key for acknowledging or resetting messages.
6 »**Insp. hold**« key for manually activated inspiration and for extending the inspiration time.
7 »**O₂-Inhalat.**« key (optional) for O₂ inhalation or »**100% O₂**« key (optional) for 100 % O₂ application.
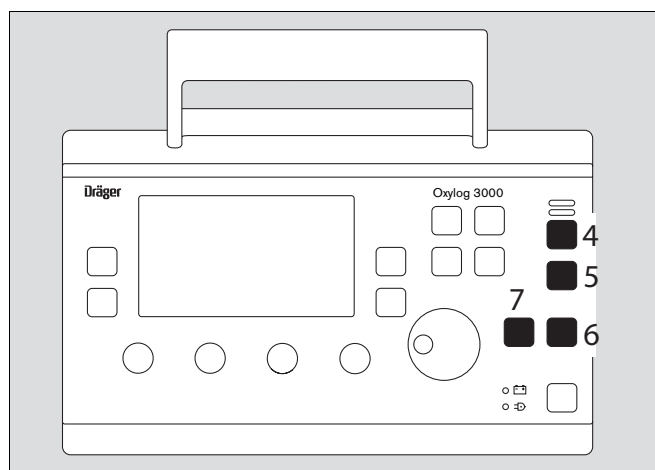
Screen Operating Controls

8 Central "turn and push" rotary knob for selecting and setting the options displayed on the screen.
Screen operating keys:
9 »**Values** ▷▷ « key for changing screen pages in the "Measured values" window in order to display the measured values.
10 »**Curves** ◤▪╮ « key for selecting the main page to display the pressure curve or flow curve.
11 »**Settings** ▷▷ « key for superimposing or changing screen pages in the "Setting" window in order to set other ventilation parameters.
12 »**Alarms** ▷▷ « key for superimposing or changing screen pages in the "Alarms" window in order to set and display the alarm limits.
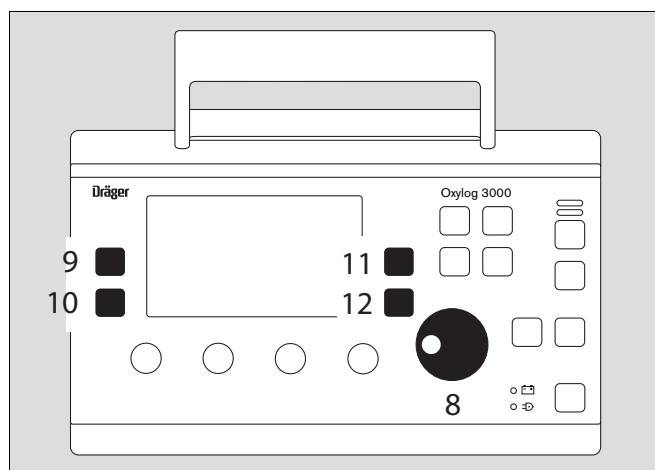
Changing screen pages in the windows
To change to the next page in the "Setting" or "Alarms" window:
11 press »**Settings** ▷▷ « key
or
12 »**Alarms** ▷▷ « key again.
To change to the pressure or flow curves main page:
10 Press »**Curves** ◤▪╮ « key.

Structure of the screen windows

1 Status and alarm messages window
2 Measured values display window
3 Curves and measured values window
4 Settings and alarms window
5 Information window

"Values" screen window

6 Line displaying all the measured values in the current ventilation mode.
7 Successful triggering by the patient is indicated by the brief appearance of an asterisk in the upper line, between indication of the ventilation mode and the alarms window.
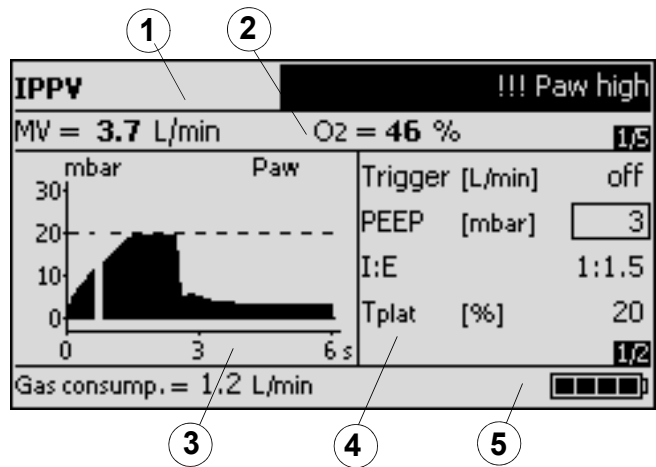8 Measured values 1/5 :
   1st page of 5 available pages
To change to the next page:
● Press »**Values** ▷▷ « key.
   The pages are displayed consecutively.
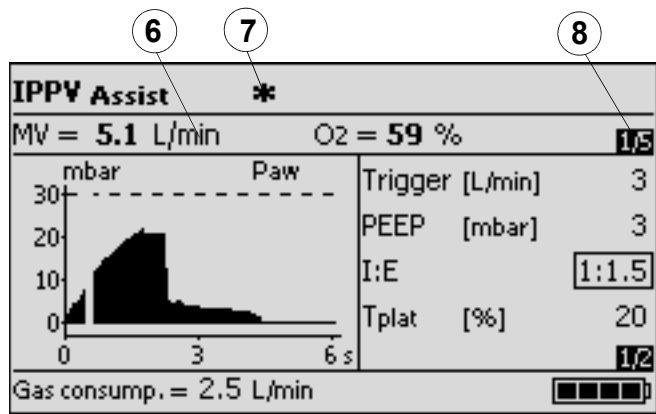
"Settings" screen window

9 Setting menu for setting the supplementary ventilation parameters in accordance with the desired ventilation mode:
   – Ventilation time ratio »**I:E**«,
   – Inspiration time »**Tinsp**«,
   – Positive end expiratory pressure »**PEEP**«,
   – Pressure support »Δ **ASB**«,
   – Inspiratory pressure »**Pinsp**«,
   – Sensitivity »**Trigger**«,
   – Plateau time »**Tplat**«,
   – Pressure rise time »**Ramp**«,
   – Non-invasive ventilation »**NIV**«,
   – Screen brightness »**Brightness**«,
   – Frequency for apnoea ventilation »**f$_{Apnoea}$**«,
   – Tidal volume for apnoea ventilation »**V$_{TApnoea}$**«
10 Setting 1/2 :
1st page of 2 available pages.
● Select Parameter.
   The selected parameter is indicated by a frame.
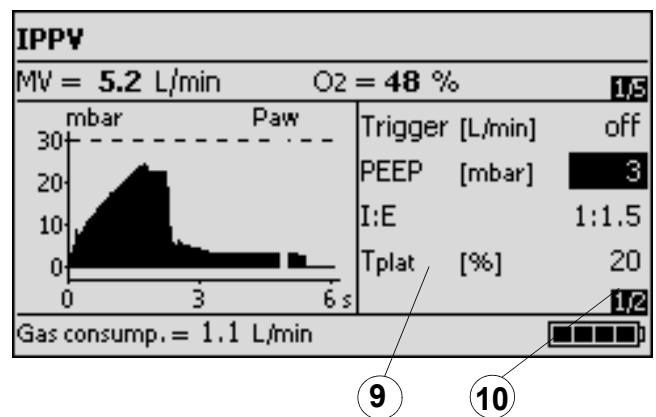
● Activate parameter for setting.
  The active parameter appears light on a dark background.
● Set parameter and confirm.
  To change to the next page:
● Press »**Settings** ▷▷« key.
  The pages are displayed consecutively.

"Alarms" screen window

1 Setting menu for setting alarm limits and alarm parameters.
For detailed operating instructions, see "Setting alarm limits" on page 53.
Alarms 1/2 :
First of two pages in the menu.

To change to the next page:
● Press »**Alarms** ▷▷« key.
  The pages are displayed consecutively.

Pressure curves main page

Displays the Paw (t) curves.
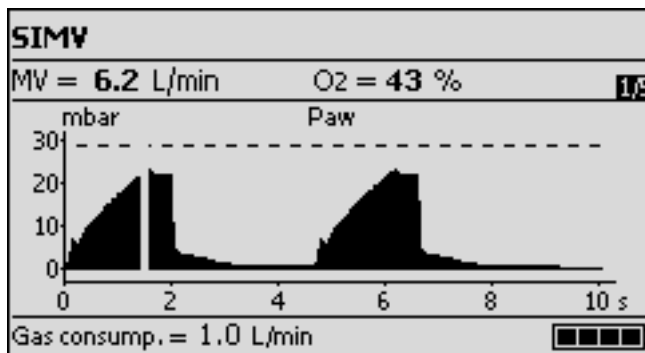
Flow curves main page

Displays the Flow (t) curves.
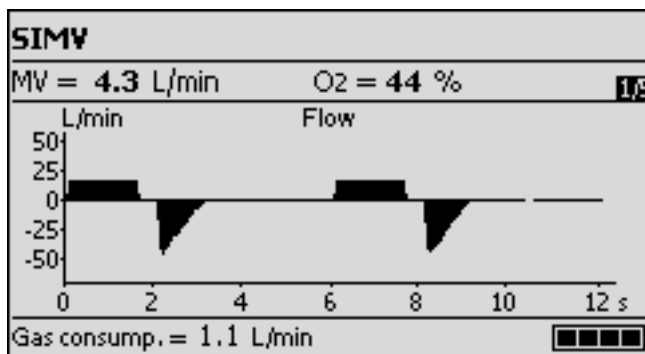
To change to the next page:

1 Press »**Curves** ◢◼┏ « key.
The pages are displayed consecutively.

To select other screen pages:

● Press the appropriate keys,
e.g.

2 screen page »**Settings** ▷▷ «

or

3 »**Alarms** ▷▷ «.

To return to the pressure curves or flow curves main page:
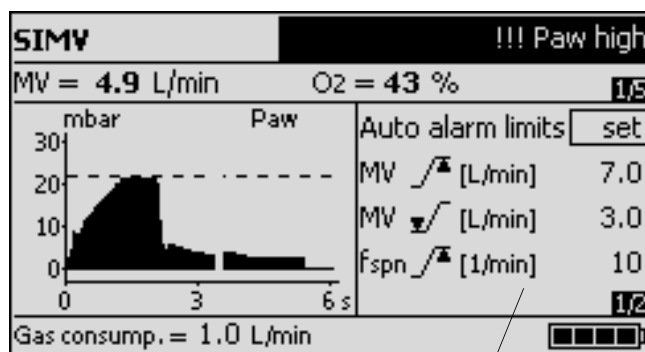
1 Press »**Curves** ◢◼┏ « key.
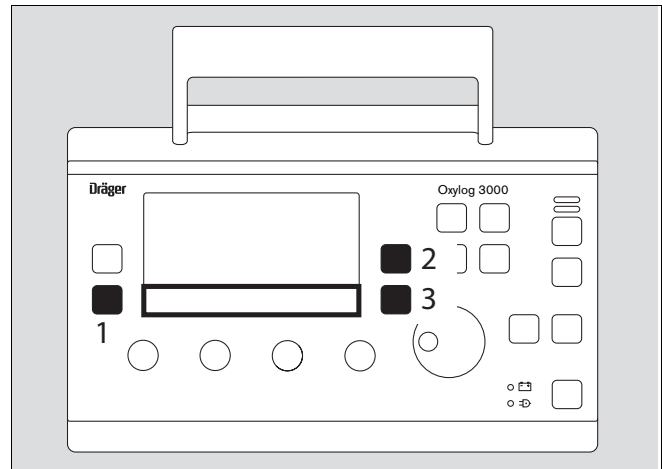
Information window on screen

When f and Vт are set with the aid of the controls below the screen, Oxylog 3000 simultaneously displays the numerical values for these parameters in the information window.

During setting of a ventilation parameter, Oxylog 3000 calculates the derived parameters and displays them in the information window.

If »**Tinsp**« is changed, for example, Oxylog 3000 will simultaneously display the resultant change in the derived parameters »**I:E**« and »**Flow**«.

If the PEEP value is set to more than 10 mbar, Oxylog 3000 will display a screen prompt which must be confirmed by the operator:

PEEP > 10 mbar?

● Press rotary knob to confirm.

Higher PEEP values can then be set.

All displays generated in the information window by settings disappear when the setting is complete. Information on the battery charge and gas consumption is displayed as default.

Preparation

Preparation

Reusable or disposable ventilation hose sets can be used. See Order List on page 101

Assemble reusable hose set

● Parts must always be sterilised before use!

Breathing valve, assembly

1

> **CAUTION!**
> The rubber disc in the housing must not be removed, damaged or bent, otherwise the valve will not work properly and endanger the patient.
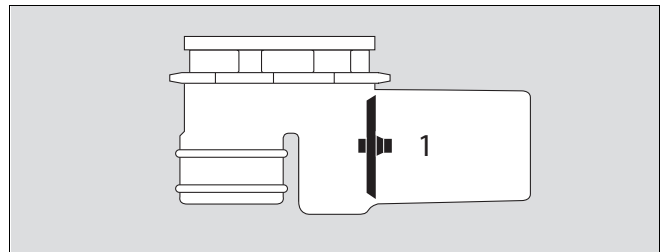
2 Place diaphragm in breathing valve – ensure that it is inserted correctly.

3 Fit cover and turn approx. 90° clockwise = lock.

4 Push flow sensor into breathing valve; note preferred position as indicated by groove.

5 Push angled connector onto flow valve.

> **CAUTION!**
> Always use an angled connector. If the angled connector is not used, the minute volume may be measured incorrectly.

However, when using a bacterial filter or HME, measured flows may deviate from the expiratory flows, as temperature and humidity of the gas are reduced.
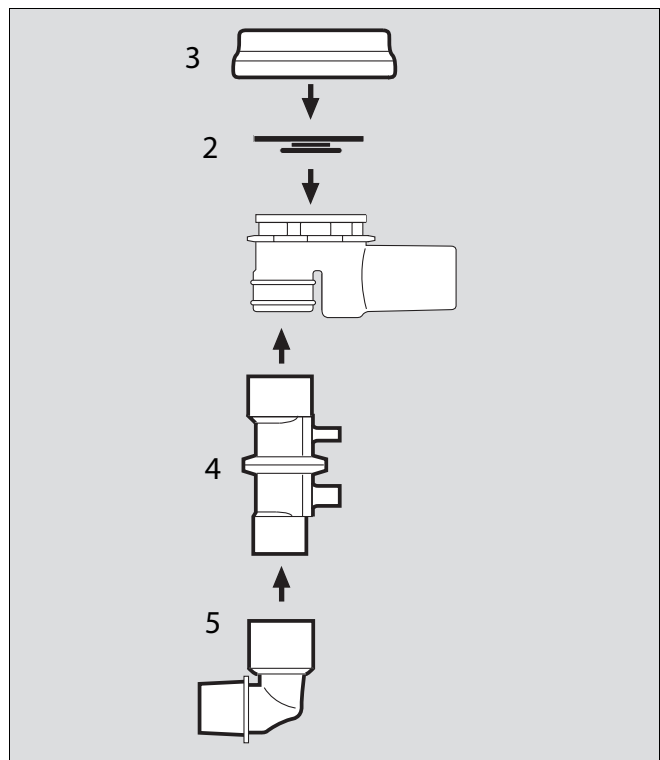
When using a bacterial filter or HME (Heat Moisture Exchanger)

● Connect the bacterial filter or HME to the angled connector.

> **CAUTION!**
> Bacterial filters increase the breathing resistance and dead-space volume of the ventilation equipment.

The flow measurement function on the patient side does not depend on the use of an HME.
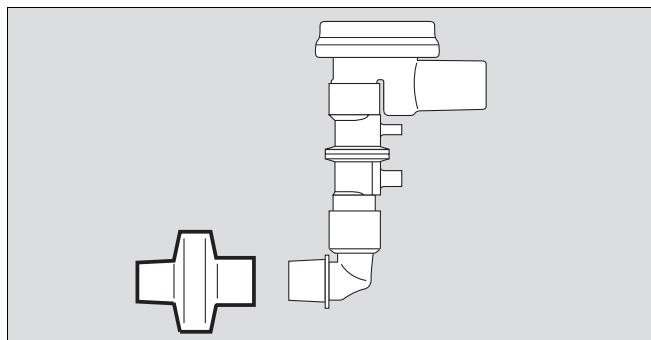
1 Connect ventilation hose to socket of breathing valve.

> **CAUTION!**
> Do not use electrically conductive hoses! These can endanger both the ventilator and the assistant during defibrillation.

2 Connect flow measuring hoses to sockets on flow sensor – note different diameters.
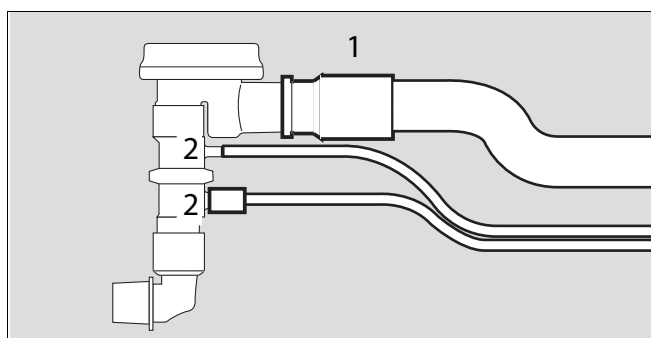
3 Plug flow measuring hoses into Oxylog 3000.
4 Connect ventilation hose to socket on Oxylog 3000.

27
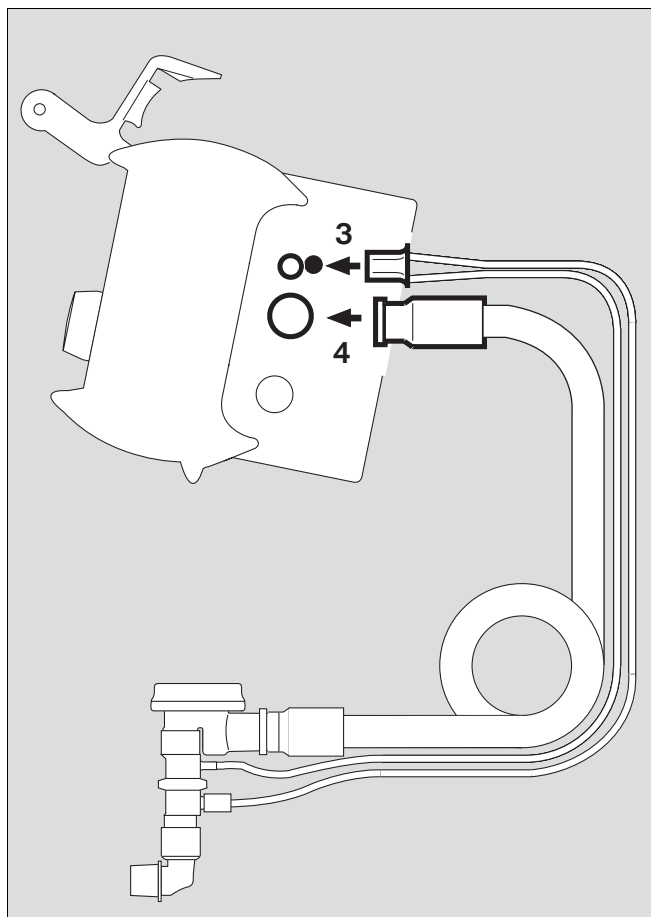
Connect disposable hose set

— instead of the reusable hose set.

> **CAUTION!**
> Do not use disposable hose sets other than those in the order list. The minute volume may be measured incorrectly and the device may malfunction if other disposable hose sets are used for ventilation.

1   Connect blue flow measuring hose to the blue socket,
2   and the transparent flow measuring hose to the other socket.

> **CAUTION!**
> Ensure the flow measuring hoses are correctly orientated otherwise the volume will be measured incorrectly.

3   Connect ventilation hose to socket on Oxylog 3000.
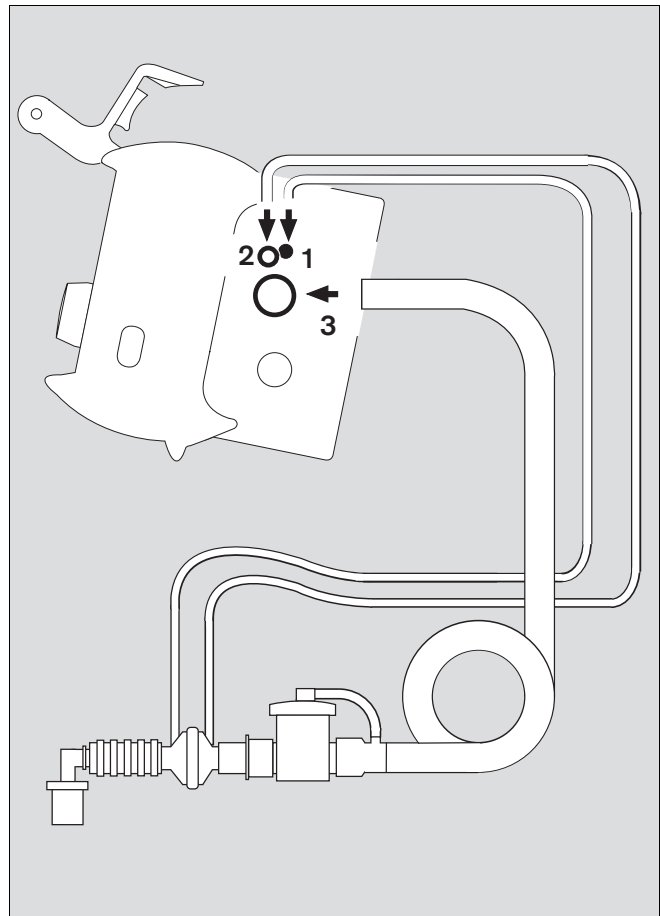
When using a bacterial filter or HME (Heat Moisture Exchanger)

● Connect bacterial filter or HME.

> **CAUTION!**
> Bacterial filters increase the breathing resistance and dead-space volume of the ventilation equipment.

The flow measurement function on the patient side does not depend on the use of an HME.

However, when using a bacterial filter or HME, measured flows may deviate from the expiratory flows, as temperature and humidity of the gas are reduced.
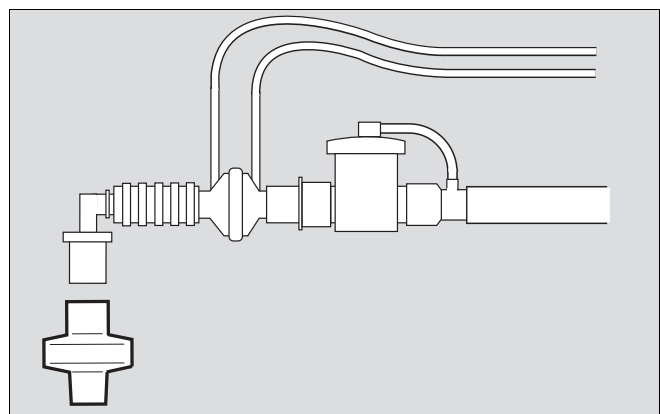
When changing the ventilation hose set

If the reusable ventilation hose set is to be used instead of the disposable hose set or vice versa:

● Have sockets on device changed by specialists and
● reconfigure device accordingly, see "Customer Service Mode", page 76.

Connecting power supply

Oxylog 3000 is designed to operate on power supplies with different voltages:

Internal supply

— with rechargeable battery (specified Smart Battery, see "Technical Data", page 84)

Additional external power supply

To recharge the battery and to extend the electrical operation time when using a rechargeable battery.
— DC voltage from the on-board power supply via DC/DC converter or
— with AC/DC power pack.

> **CAUTION!**
> A fully charged battery must always be installed for safety reasons, even when operating from an external power supply!

● Have a fully charged battery at hand, page 30.

> **CAUTION!**
> Treatment of batteries:
> - Do not throw into fire,
> - Do not force open
> Danger of bodily injury.

The device can only ventilate the patient continuously even when the external power supply is interrupted if fully charged batteries are always available.

Internal supply with rechargeable battery

Replacing the battery

See "Order List" on page 101 for a list of suitable types.
On the connection side:
1 Turn screw on battery compartment cover anticlockwise until the cover can be opened.
2 Swing the cover downwards,
3 pull the battery forwards by the tab and remove it.

Check the charge of the charged battery:
● Press button on rechargeable battery: its charge is indicated as a percentage by LEDs.
Recommendation:
● Use fully charged batteries.

3 Push the fully charged battery in – plug connector at bottom –
2 swing cover upwards,
1 and tighten screw.

> **CAUTION!**
> Oxylog 3000 will interrupt ventilation when the battery is replaced while the device is switched on and the external power supply is not connected. It resumes ventilation with the last values set not more than 3 seconds after fitting a fully charged battery.

Instructions for Use, Oxylog 3000 en
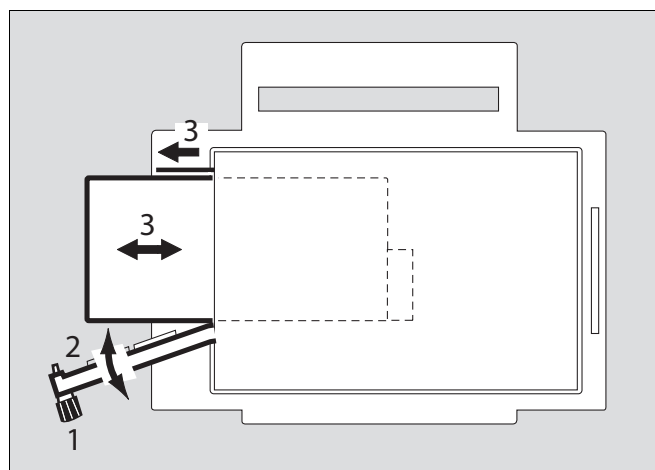
Charging the battery

● The ambient temperature must be between 0 and 35 °C when charging the batteries!

When the external supply is available:

1 the green lamp » ⊅ «, lights up regardless of whether the ventilator is switched on or off. The battery is being charged.
2 The three-coloured indicator » ⊡ « lights up to show the momentary charge status of the battery:

yellow: while the battery is still being charged,
green: when the battery has been fully charged,
red: if a serviceable battery has not been inserted or technical failure occurred

Indicators » ⊅ « and » ⊡ « remain off while the ventilator is being operated from the internal battery.

An Oxylog 3000 charging station connected to the mains supply can be used to charge the battery externally, see "Order List", page 101.
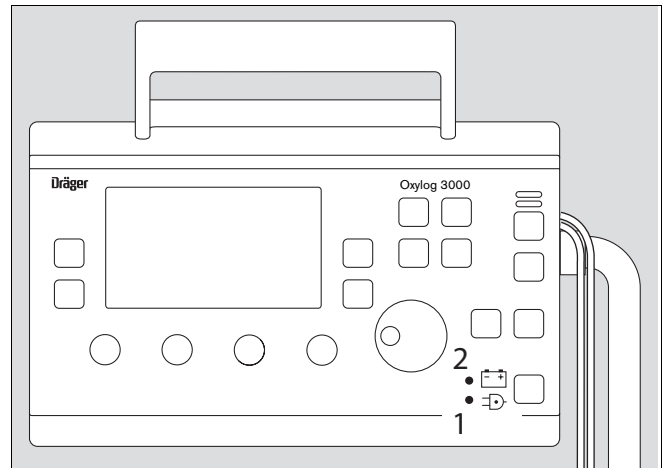
Indication of battery capacity / battery operation

3 The current capacity of the battery is indicated by Oxylog 3000 in 25 % increments in the bottom right-hand line of the information window when switched on:

— when charging from an external power supply,
— as the battery is discharged during operation.

Example: 75 % charge

The accuracy of the capacity indication can vary, depending on the age and degree of use of the battery, see "Technical Data", page 86.

The capacity indication is overwritten if other, more important messages have to be displayed on the ventilator.

Additional alarms draw attention to the remaining operating time of the battery.

When operated via the rechargeable battery, the brightness of the ventilator screen is reduced in order to save power.

The screen brightness is automatically increased to maximum for one minute while settings are being made.
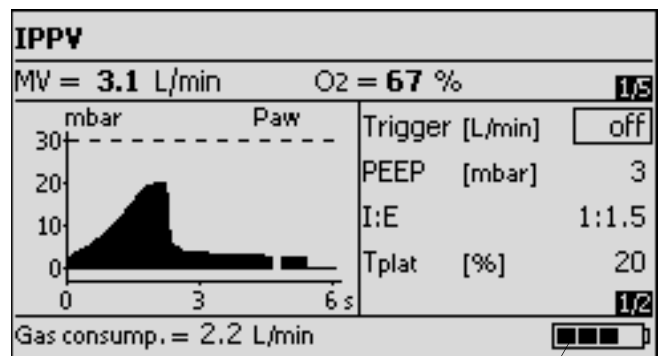
External power supply with DC/DC converter

The DC/DC converter should be used to connect the Oxylog 3000 to on-board supplies of different voltages (12 V, 24 V, 28 V DC). The voltage of the on-board supply may fluctuate, depending on the amount of power required for various purposes with the result that the supply voltage falls below or exceeds the range permitted for the Oxylog 3000. The on-board voltage is converted into a constant DC voltage of approx. 19 V DC by the DC/DC converter:

● When connected to an external power supply (e.g. the on-board power supply of the vehicle), the ventilator must always be connected via the DC/DC converter, see "Order List", page 101.
1 Plug the large connector of the DC/DC converter into the on-board supply
2 and the small connector into the DC socket of the Oxylog 3000.
3 When the Oxylog 3000 is connected to an external supply, the indicator » ⊅ « lights up and shows that the battery can be recharged.
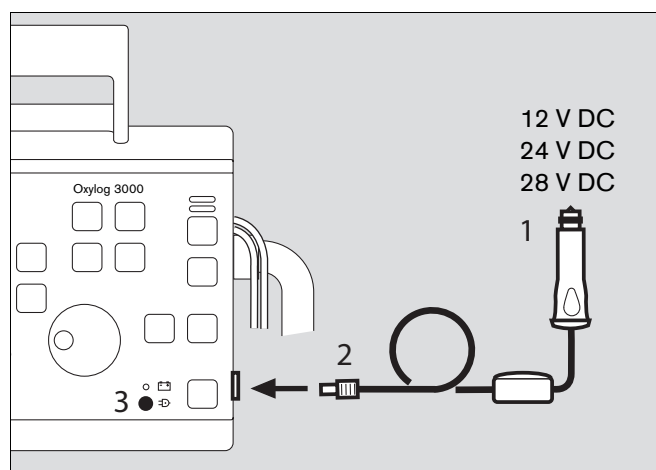
External power supply from power supply unit

● Only a specified AC/DC power supply unit may be used. See Order List on page 101.
4 Connect mains plug to mains socket
5 and DC plug to DC socket on Oxylog 3000.
6 When the Oxylog 3000 is connected to an external supply, the indicator » ⊅ « lights up and shows that the battery can be recharged.
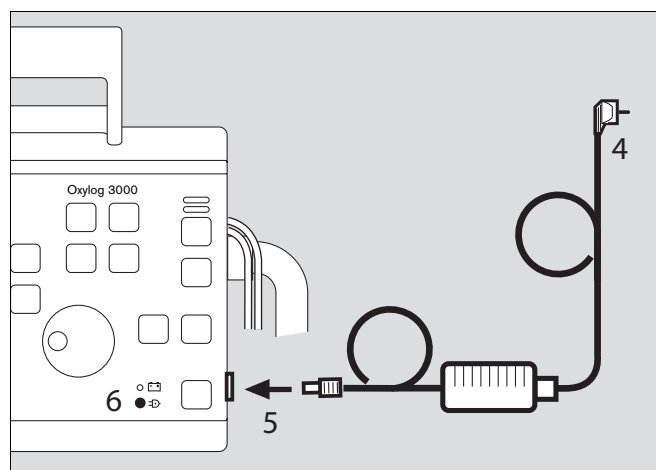
Connecting gas supply

Take care when handling O_2:

WARNING!

Secure O_2 cylinders so they cannot fall over and keep away from excessive heat.
Risk of explosion!

WARNING!

Do not grease or lubricate O_2 fittings, such as cylinder valves and pressure reducers, and do not handle with greasy hands. Risk of fire!

● Only open or close cylinder valves by hand and rotate smoothly. Do not use tools.

WARNING!

No smoking and no naked lights. O_2 makes all fires burn more fiercely!

CAUTION!

Always provide adequate ventilation in order to maintain ambient **O_2** concentration < 24%.

Oxylog 3000 can be supplied with either O_2 or medical air.

● The gas type must be set in the configuration menu to ensure correct metering, "Selecting the gas type", page 61.

Supply from an O_2 cylinder

CAUTION!

Only use compressed gas cylinders which comply with national regulations and have been approved.

● Use a full O_2 cylinder.
● Screw pressure reducer (270 to 600 kPa delivery pressure, 500 kPa nominal pressure) to O_2 cylinder.

CAUTION!

Only use a pressure reducer with a vent valve at the outlet to limit the delivery pressure to a maximum of 1000 kPa in case of a malfunction!

1 Screw O_2 medical gas hose into Oxylog 3000.
2 Connect O_2 medical gas hose to pressure reducer.
3 Turn cylinder **valve slowly** and open fully.

CAUTION!

Do not fit any flow control valves or flowmeters in the gas supply to Oxylog 3000 – the ventilator could malfunction!

CAUTION!

Always check O_2 pressure of cylinder before use.
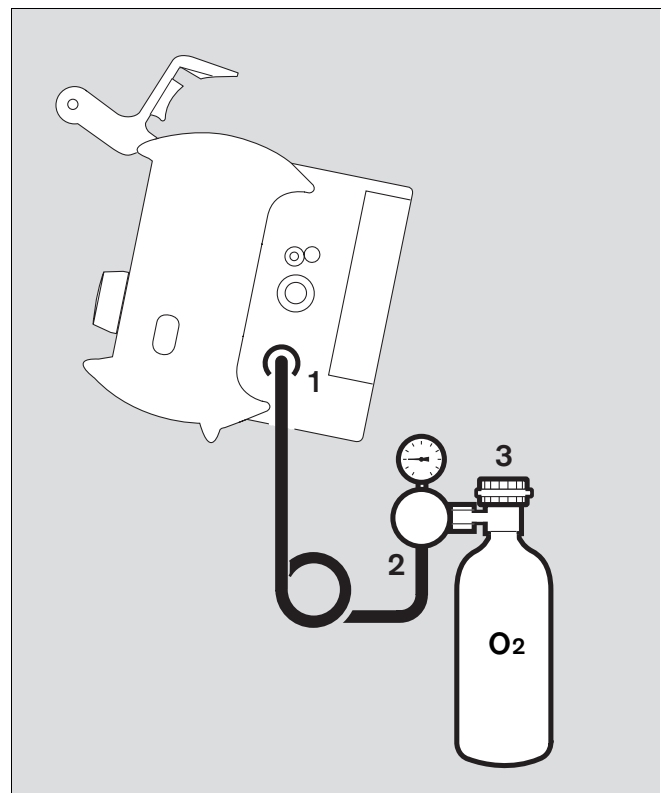
Determining the approximate pneumatic operating time for Oxylog 3000

Example for supply of medical gas:
Cylinder pressure measured on the pressure gauge of the pressure reducer: 2000 kPa
Liquid capacity of the O_2 cylinder: 2.5 L
Supply of medical gas: 2.5 L x 2000 kPa = approx. 500 L

Example for pneumatic operation time:
IPPV mode, frequency 10 1/min, V_T = 1 L, O_2 = 100 %
Minute volume = 10 1/min x 1 L = 10 L/min

Operation time = $\dfrac{\text{Medical gas supply [L]}}{(MV +0.5^*) \text{ [L/min]}}$

Operation time = $\dfrac{500}{10.5}$ = approx. 48 minutes

The pneumatic operation time increases when Oxylog 3000 operates with an O_2 concentration of less than 100 % O_2, since it additionally draws in ambient air in this case.

1 The amount of gas from the high-pressure supply which is currently being consumed, is indicated by Oxylog 3000 in the bottom left-hand line of the information window in L/min (gas consumption of ventilator + MV of the patient). This display is overwritten if other, more important messages have to be displayed on the ventilator.

Example:
O_2 consumption = 2.5 L/min
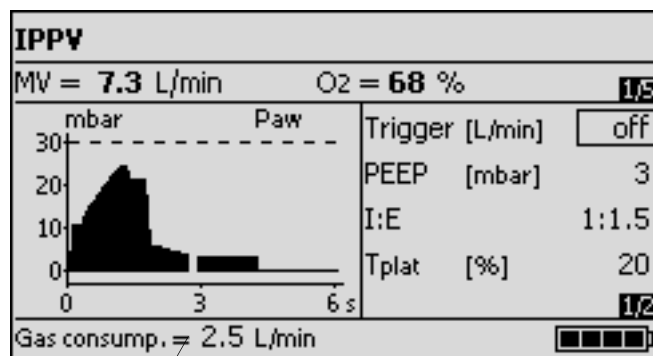
_____
* Gas consumption of ventilator: max. 0.5 L/min

Supply from a piped medical gas system

1 Screw O_2 medical gas hose into Oxylog 3000 and
2 plug gas probe into O_2 terminal unit until it has engaged twice and the supply of O_2 is assured.
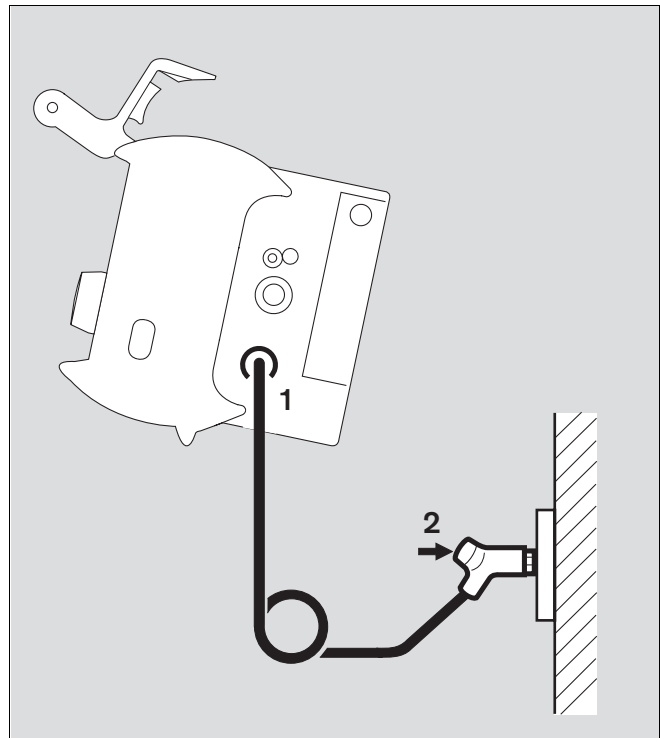
Hanging the Oxylog 3000 on standard rails

The Oxylog 3000 can be hung on various rail systems and bars measuring up to 38 mm diameter by means of the claw. Care must be taken to ensure that the rail is completely
inserted in the claw. To ensure optimal functioning of the claw, a distance of at least 25 mm between rail and wall is required.

CAUTION!
When hung on a bar or rail, the Oxylog 3000 is only held by its own weight. The Oxylog 3000 must be secured additionally when being transported, vibrations may cause the Oxylog 3000 to fall off.

Before using for the first time

● Ensure that batteries are fully charged, page 30.

Instructions for Use, Oxylog 3000 en

Checking readiness for operation

— whenever the ventilator has been prepared or the
ventilation hoses changed
— at the latest every six months.

The following functions are checked with the menu-
based test:

— Gas supply present
— Hose system / breathing valve connected and OK
— Alarm functions OK
— Ventilation functions OK
— Monitor functions OK.

Oxylog 3000 interrupts the test if a fault is detected.
The relative fault is indicated on the screen.

> **WARNING!**
> **The patient may be endangered if the above pre-
> use check is not carried out.**

Connecting test lung

The test lung comprises:

1 an angled connector for connection to the ventilation
valve,
2 a catheter connector, diameter 7 mm, in the angled
connector – to simulate the resistance of the
airways.
3 2 L test lung to simulate the lung compliance.

> **BTPS* values of a test lung are not the same as
> the BTPS values of a patient. The Oxylog 3000
> measures and adapts according to BTPS values
> of a patient. Therefore, when a test lung is
> connected, the MV and V$_T$ indicated on display
> may differ from the MV and V$_T$ that is set by the
> operator.**

*   BTPS: Body Temperature Pressure Saturated
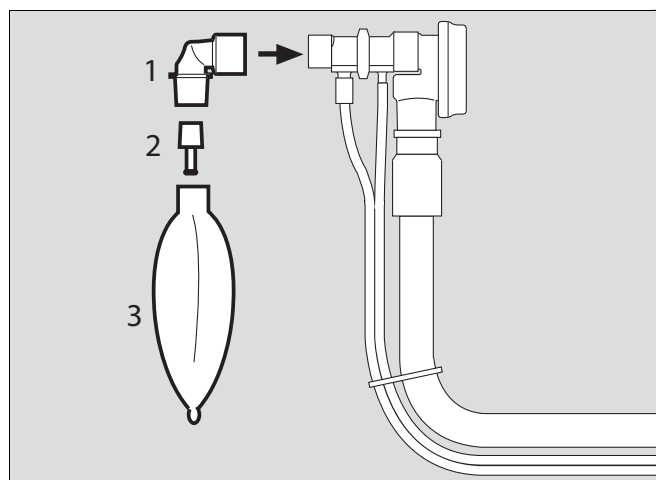
Perform device check

Duration: approx. 3 minutes.

4 Switch Oxylog 3000 on = press the » « key. The
device runs through a self-test and the operator is
prompted, on the display, to call up the configuration
menu or device check:
»**Press rotary knob for device check and
configuration**«
5 Press rotary knob to confirm.

Dräger
Technology for life
Software 01.00
Self test ■■■■□□

Press rotary knob for device check and configuration
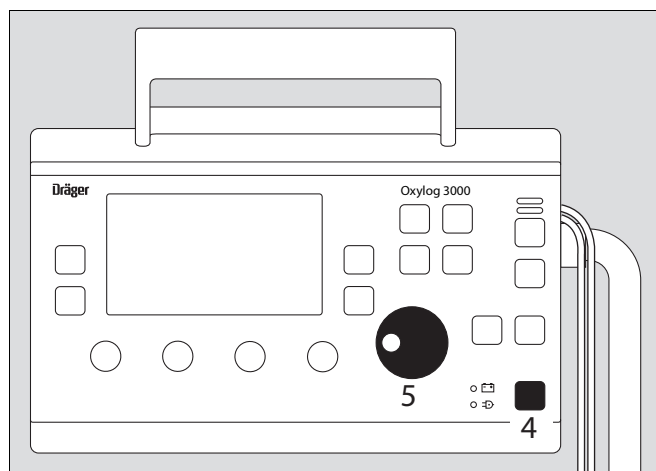
● Select »**Device check**« in main menu and confirm.
The device check can be ended at any time by
pressing the »**Alarm Reset**« key.

Menu

Device check

Configuration and information

Ventilation

Quit with key alarm reset
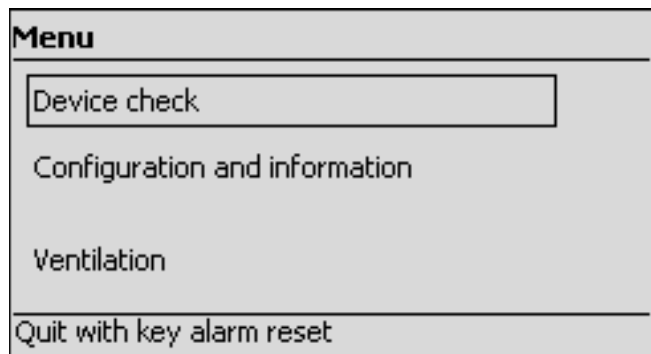
● Ensure that the gas supply has been connected.

Device check

Supply Pressure   Connect

1/5

Quit with key alarm reset
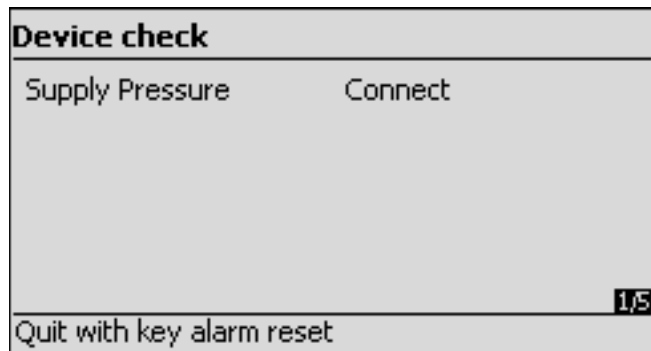
● Ensure that the correct gas type (O_2 or medical air)
has been set and confirm.

If the wrong gas type has inadvertently been set:
● Press »**Alarm Reset**« key to cancel device check.
● Set correct gas type in configuration »**Select gas
supply**« and restart device check.

Device check

Supply Pressure   ✓

Supply Pressure O2   Confirm with ●

1/5

Quit with key alarm reset
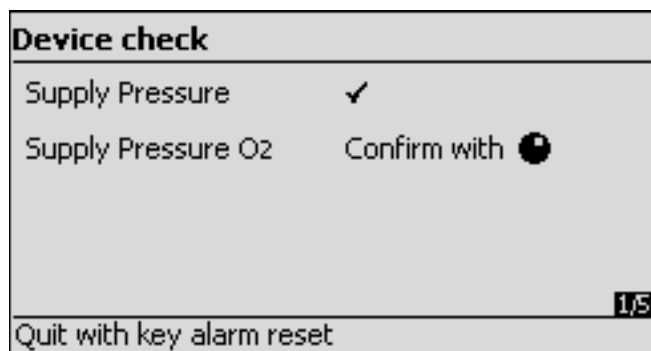
● Ensure that the test lung has been connected.

Device check

Supply Pressure	✓
Supply Pressure O2	✓
Test lung	Connect

1/5

Quit with key alarm reset

Oxylog 3000 automatically checks whether a test lung has been connected. The device check is aborted if a test lung is not detected within one minute.
The check is continued when Oxylog 3000 detects the test lung.
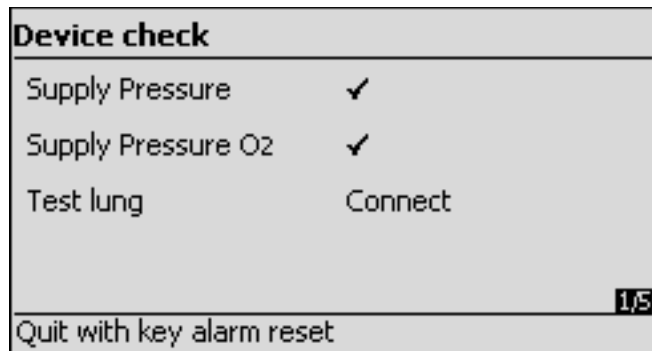
● Ensure that the configured hose system has been connected – either:
— the disposable hose set
  or
— the reusable hose set
  and confirm.
● Confirm the appropriate hose set and the second page of the device check appears.

Device check

Supply Pressure	✓
Supply Pressure O2	✓
Test lung	✓
Reusable hose set	Confirm with ●

1/5

Quit with key alarm reset

If the wrong hose set has inadvertently been configured:
● Press »**Alarm Reset**« key to cancel device check.
● Select correct hose set in "Customer Service Mode", "Select hose type", page 78, and
● restart device check.

Device check

VT 500 [mL]	✓
Freq. 10 [1/min]	✓
Pmax 30 [mbar]	✓
O2 100 [%]	Adjust rotary knob

2/5

Quit with key alarm reset
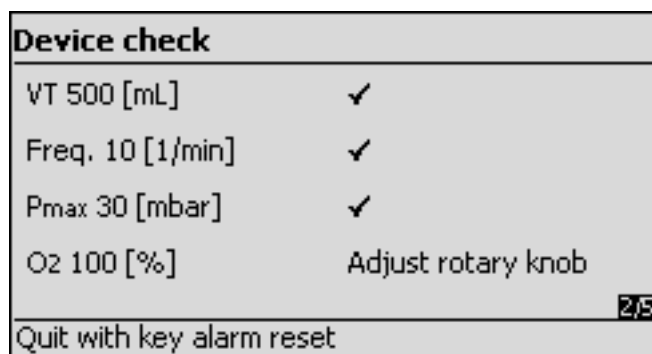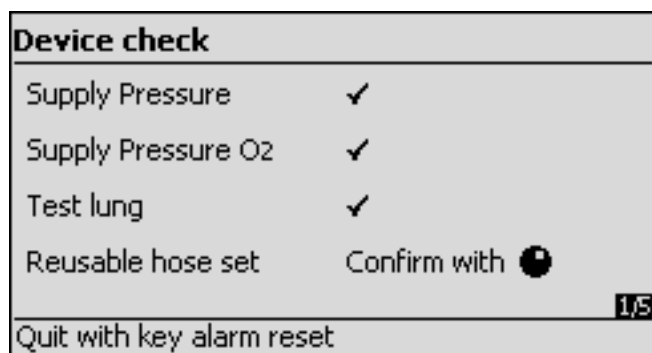
1 Set the controls below the screen to the required values.
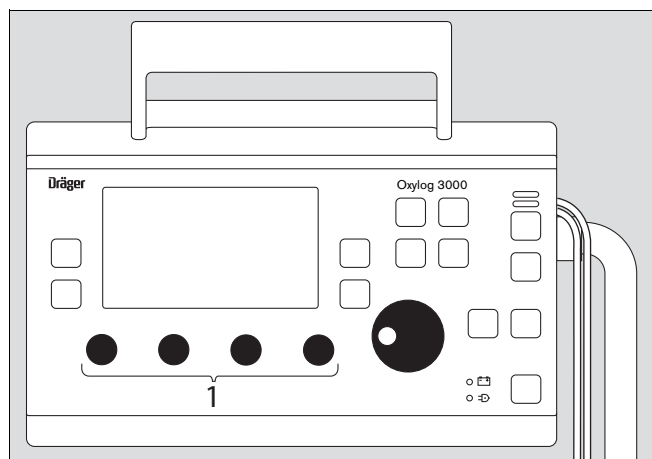
Oxylog 3000 successively activates the acoustic and visual alarm signals and prompts the operator to acknowledge each signal.

Device check

Volume loudspeaker	✓
Alarm LEDs	✓
Alarm buzzer	Confirm with ⬤

3/5

Quit with key alarm reset

● Confirm acoustic and visual alarm signals.
The device check proceeds automatically.
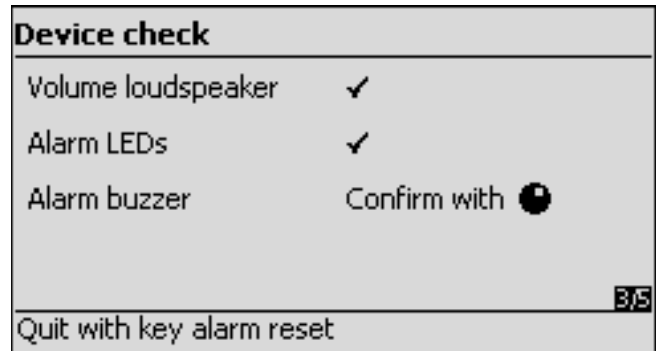
During the automatic test sequence, Oxylog 3000 checks the flow, pressure build-up and alarm signals. Corresponding sounds are heard.
The bar graph shows the progress made by the check.

Device check

Device check ventilation, monitoring and

alarm detection is running!

4/5

Quit with key alarm reset
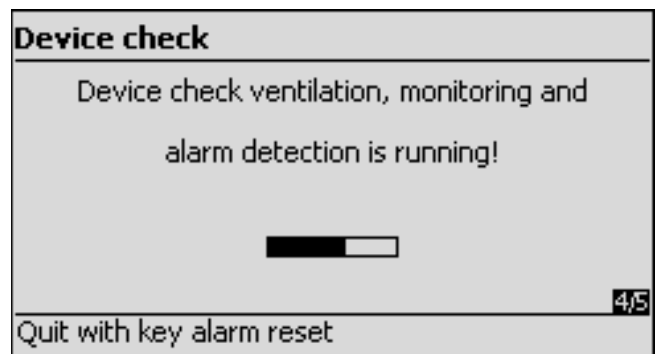
The result is displayed by Oxylog 3000:

Device check

Device check ventilation, monitoring and

alarm detection successfully finished!

5/5

Confirm with ⬤

● Confirm, and the system switches back to the menu screen.

If the device check cannot be completed successfully:
● Consult the section "Error messages during device check", page 39.
● Check configuration, page 60.
● Consult the chapter "Fault – Cause – Remedy", page 64.
● Call DrägerService.
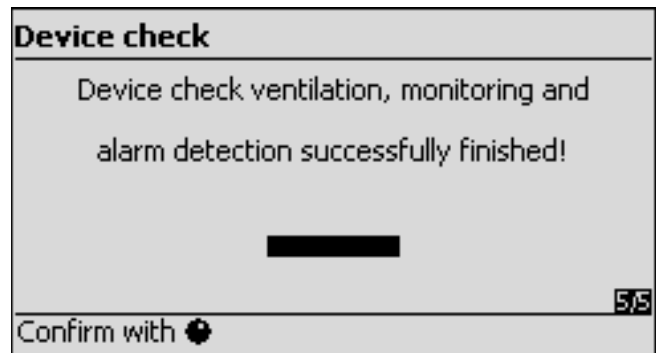
NOTE:
The ventilator is ready for operation only after all functional tests were performed successfully.

● Assemble the Oxylog 3000 ready for operation, page 26.
● Connect to power supply and gas supply, page 29.

Start the ventilator:
● Select »**Ventilation**« and confirm
or
● press »**Alarm Reset**« key.

Menu

Device check

Configuration and information

Ventilation

Quit with key alarm reset
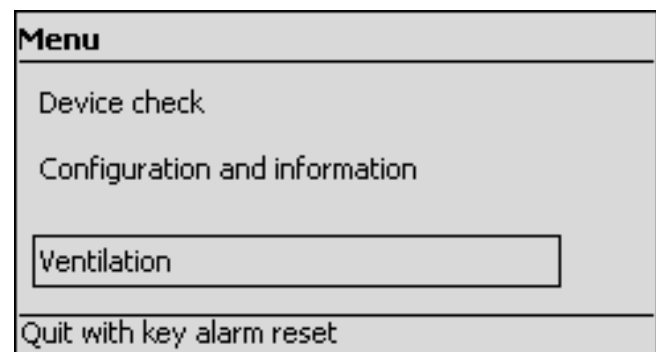
Error messages during device check

Message	Cause	Remedy
No communication control- / charge-board	Device defective.	Call DrägerService.
System leakage	Leak in ventilation hose and/or test lung.	Check hoses, breathing valve, flow sensor and test lung for leaks and replace if necessary.
	Internal leak in system.	Call DrägerService.
No testlung	Test lung not connected or major leakage.	Connect test lung. Check hoses, breathing valve, flow sensor and test lung for leaks and replace if necessary.
Breathing valve inop	Breathing valve has malfunctioned.	Check correct condition of breathing valve including diaphragm and rubber disc; fit a new breathing valve if necessary or use a new disposable hose set.
Pressure measurement inop	The ventilation hose set has not been connected correctly.	Connect ventilation hose set correctly.
	Pressure measurement is implausible.	Call DrägerService.
PEEP valve inop	Internal leak in system.	Check hoses, breathing valve, flow sensor and test lung for leaks and replace if necessary.
	Device defective.	Call DrägerService.
Flow measurement inop	Flow measurement implausible.	Replace flow sensor. Call DrägerService.

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Operation

Operation

Check readiness for operation, page 35.

Starting operation

> **CAUTION!**
> Always use a ventilator that has been cleaned and disinfected and has been successfully tested to be ready for operation.

Switching on

1   Briefly press the »⏻« key.
Oxylog 3000 carries out the self-test.

●   Wait for the 5 second self-test to be completed.

Upon expiry of the self-test, the ventilator automatically starts ventilation with the default settings.
Manufacturer's default settings:

— Ventilation mode **IPPV (CMV)**
— Ventilation time ratio **I:E** = 1:1.5
— Positive end expiratory pressure **PEEP** = 5 mbar
— Plateau time **Tplat** = 0 %
— **Trigger** = OFF.

The manufacturer's default settings can be adjusted in "Customer Service Mode", "Set startup settings", page 77.

During the self-test, the system briefly displays the starting page with the software version and a prompt for the operator to select the configuration menu or to activate the device check by pressing the rotary knob.

The bar graph indicates the progress made in the self-test.

The standard screen with pressure curve and settings window is displayed if the central rotary knob is not pressed.

Preparing ventilation mode

Set ventilation parameters

2   Set the required control below the screen or

3   select, set and confirm a parameter on the screen.

The former settings are retained if confirmation is not received within 15 seconds. Attention is drawn to this fact by the advisory message »**! Settings not confirmed**«.

If extreme values are set which must be confirmed, an acoustic alarm sounds with an advisory message in the information window.

When changing to another ventilation mode, values cannot be preset for the new ventilation mode.

To activate the ventilation mode

4   press the key for the ventilation mode for approx. 3 seconds,
or

4   briefly press the key for the ventilation mode and confirm.

The new ventilation mode selected is now effective.
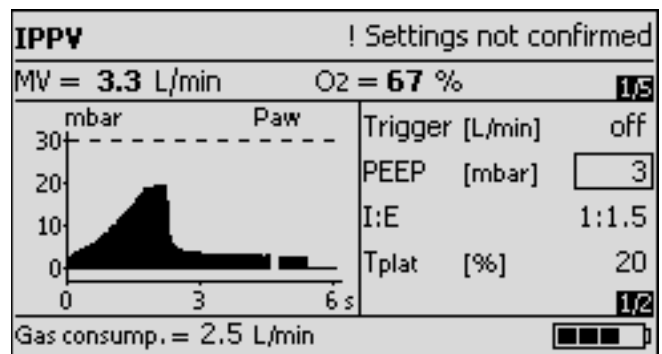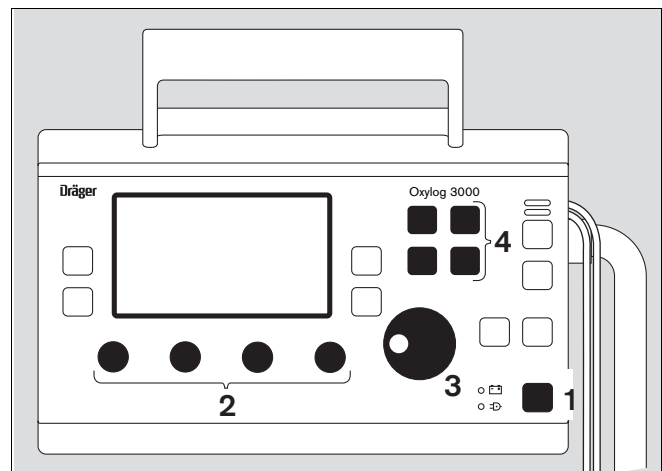
IPPV (CMV), IPPVAssist (CMVAssist)

IPPV – **I**ntermittent **P**ositive **P**ressure **V**entilation
Volume-controlled ventilation with fixed mandatory minute volume MV, set with tidal volume V_T and frequency Freq.

NOTE:
For patients without spontaneous breathing, see details on page 94 onwards.

IPPVAssist – **I**ntermittent **P**ositive **P**ressure **V**entilation **A**ssisted
For patients with partial spontaneous breathing.
For synchronisation with the patient's spontaneous breathing.
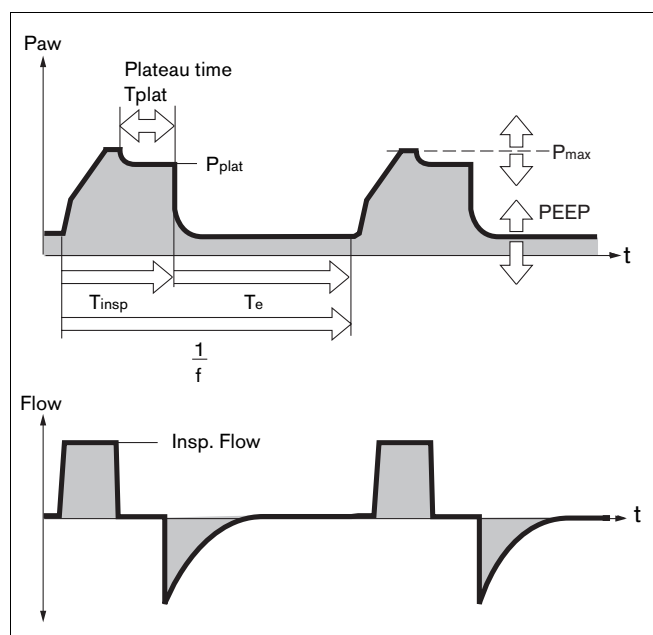
Set ventilation pattern with the controls below the screen:
— Tidal volume »**Vт**«
— Ventilation frequency »**Freq**.«
   (minimum possible frequency: 5 per min.)
— Maximum airway pressure »**Pmax**«
— O2 concentration »**O2**«.

The following can be set on the screen:
— Ventilation time ratio »**I:E**«
— Positive end expiratory pressure »**PEEP**«
— Plateau time »**Tplat**«, in % of the inspiration time.

When setting the ventilation frequency Freq., tidal volume V_T or ventilation time ratio I:E, the associated values for inspiration flow and inspiration time Tinsp are automatically displayed in the information window.
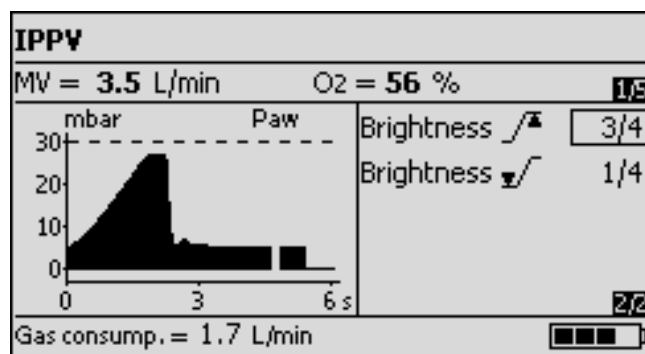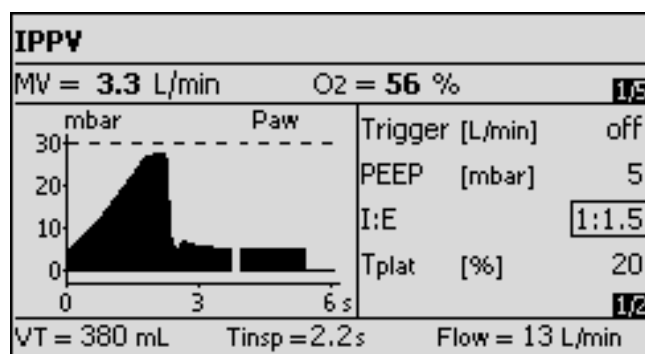
IPPV (CMV) can be extended to include the trigger function IPPVAssist (CMVAssist):

Trigger (IPPVAssist)

For synchronisation with the patient's spontaneous breathing efforts.

The mandatory ventilation strokes are synchronised with the patient's spontaneous breathing efforts when the trigger is activated and the trigger sensitivity set.

The actual frequency may be higher than the set ventilation frequency Freq. in this case.

The trigger can be deactivated if synchronisation with the patient's spontaneous breathing efforts is not desired.

Successful patient triggering is briefly indicated by an asterisk (*) in the middle of the top line of the screen.

Activating/setting the trigger:

1 Press key »**Settings** ▷▷ « until the parameter trigger is displayed.
● Select line »**Trigger**« on the screen and then set and confirm the value.
   Small value = high sensitivity

The ventilation mode »**IPPVAssist**« is displayed on the screen.

Deactivate trigger:

● Set a value less than 3 L/min or greater than 15 L/min,
● display »**off**« confirm.

The last effective trigger value is adopted by the ventilator when changing from IPPVAssist to SIMV, BIPAP or CPAP/ASB.
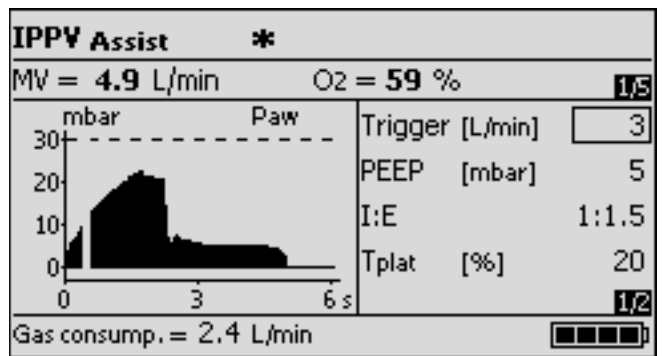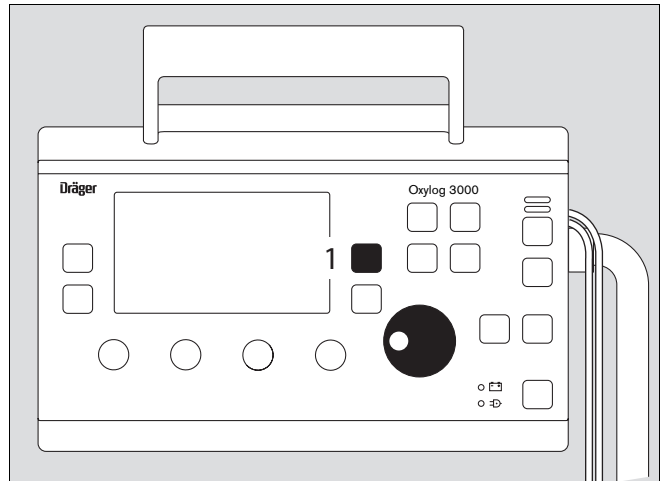
For heart-lung resuscitation

The airway pressure Paw is limited to the set Pmax value by Oxylog 3000 without ending inspiration prematurely (pressure-limited, inconstant-volume ventilation when Pmax is reached).

Pmax should be set to a high value in order to apply the maximum possible minute volume.

IPPV		!!! Paw high
MV = **9.6** L/min	O2 =**100%**	**1/5**

mbar	Paw	Trigger [L/min]	off
60		PEEP [mbar]	5
45		I:E	1:1.5
30		Tplat [%]	0
15			
0			
0 3 6 s			**1/2**

Gas consump. = 6.6 L/min
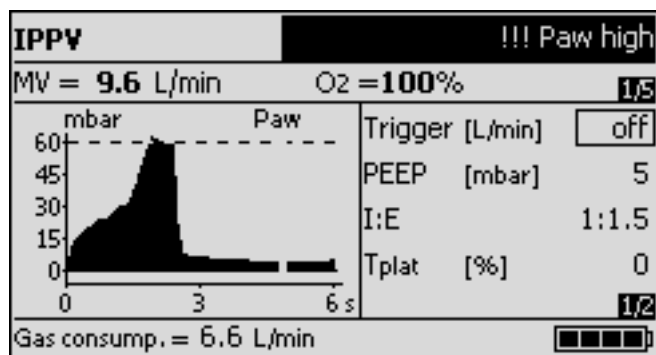
Setting alarm limits, page 53.

SIMV, SIMV/ASB (SIMV/PS)

Synchronised **I**ntermittent **M**andatory **V**entilation
Assisted **S**pontaneous **B**reathing

Fixed mandatory minute volume MV set with tidal
volume V_T and ventilation frequency Freq. The patient
can breathe spontaneously between the mandatory
ventilation strokes and thus contribute to the total
minute volume. Spontaneous breathing can be
assisted with ASB.

For patients with inadequate spontaneous breathing or
for patients who are to be weaned by gradually
reducing the mandatory portion of the total minute
volume.
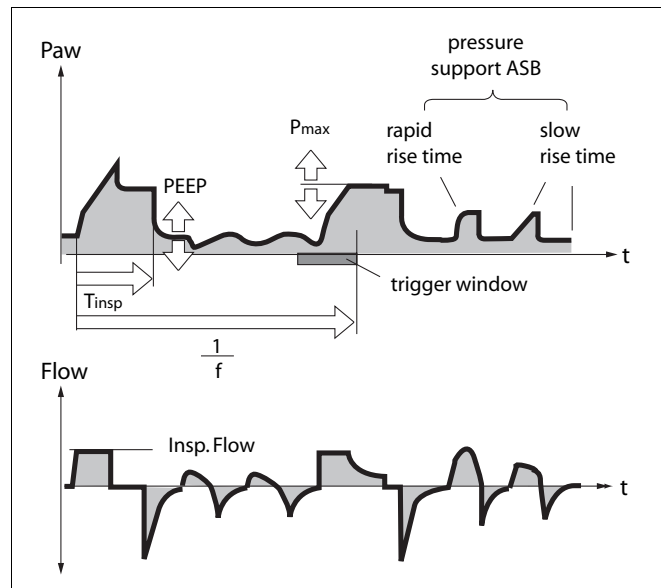
Set ventilation pattern with the controls below the
screen:
— Tidal volume »**V**ᴛ«
— Frequency »**Freq**.«
— Maximum airway pressure »**Pmax**«
— O₂ concentration »**O2**«.

The following are set on the screen:
— Inspiration time »**Tinsp**«
— Positive end expiratory pressure »**PEEP**«
— Sensitivity »**Trigger**«.

Successful patient triggering is briefly indicated by an
asterisk (*) in the middle of the top line of the screen.

When setting the ventilation frequency Freq., tidal
volume V_T or inspiration time Tinsp, the associated
values for inspiration flow and ventilation time ratio I:E
are automatically displayed in the information window.

Additional functions can be set on the screen:
— Pressure support »Δ **ASB**« above PEEP
— Pressure rise time »**Ramp**«
    ╱ steep ramp = short pressure rise time
    ╱ flat ramp = long pressure rise time
— Plateau time »**Tplat**«.
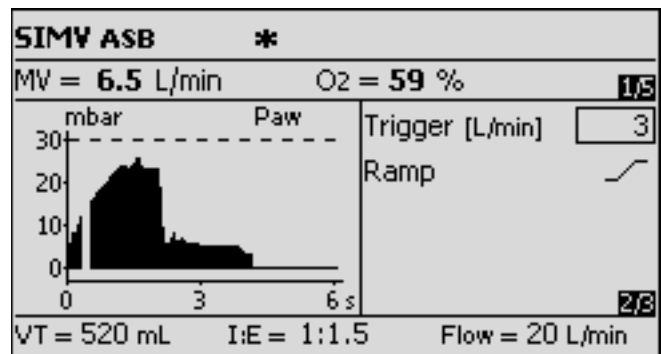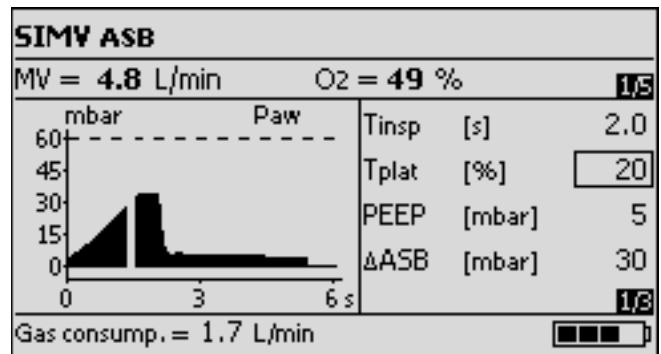
Setting alarm limits, page 53.

BIPAP (PCV+), BIPAP/ASB (PCV+/PS)

Biphasic **P**ositive **A**irway **P**ressure
Assisted **S**pontaneous **B**reathing

Pressure-controlled ventilation combined with spontaneous breathing throughout the breathing cycle and variable pressure support at CPAP level.

The mandatory portion of the total minute volume MV is set via the inspiratory pressure Pinsp, PEEP and ventilation frequency Freq.

Used for patients without spontaneous breathing, to spontaneously breathing patients shortly before extubation. The patient is weaned by gradually reducing the mandatory portion of the total minute volume MV and by reducing the pressure support Δ ASB.

Refer to the description on page 97 for details.
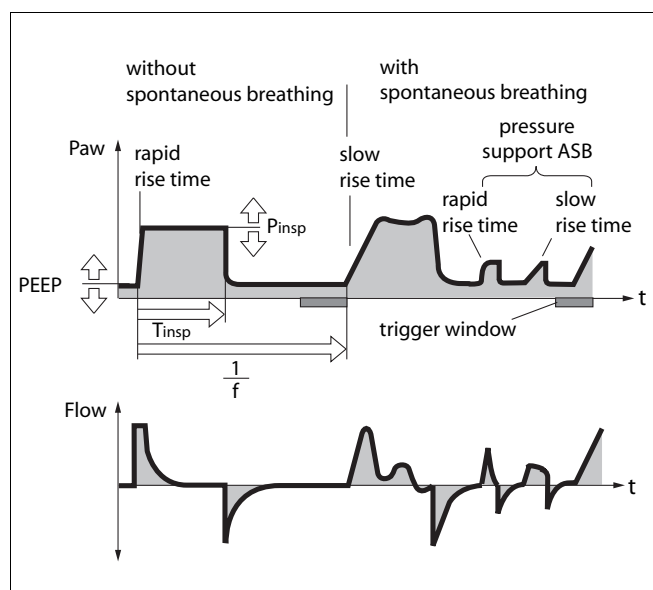
Set ventilation pattern with the controls below the screen:
— Ventilation frequency »**Freq**.«
— Maximum airway pressure »**Pmax**«
— O2 concentration »**O2**«.

The following can be set on the screen:
— Inspiration time »**Tinsp**«
— Inspiratory pressure »**Pinsp**«
— Positive end expiratory pressure »**PEEP**«
— Sensitivity »**Trigger**«
  Successful patient triggering is briefly indicated by an asterisk (*) in the middle of the top line of the screen.
— Pressure rise time »**Ramp**« (effective for the BIPAP stroke and pressure support »Δ **ASB**«).

The following can additionally be set on the screen for BIPAP/ASB:
— Pressure support »Δ **ASB**« above PEEP.

BIPAP, BIPAP/ASB can be extended to include the application mode NIV – Non-invasive ventilation, see page 51:
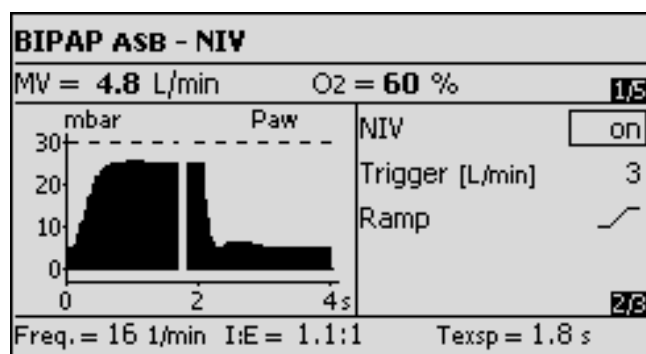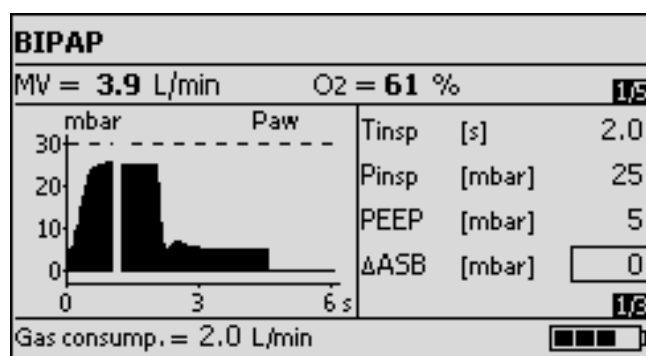
Setting alarm limits, page 53.

CPAP, CPAP/ASB (CPAP/PS)

Continuous **P**ositive **A**irway **P**ressure
Assisted **S**pontaneous **B**reathing

NOTE:

For patients with adequate spontaneous breathing.

Spontaneous breathing at an elevated pressure level to increase the functional residual capacity FRC.
Spontaneous breathing can be assisted with ASB.
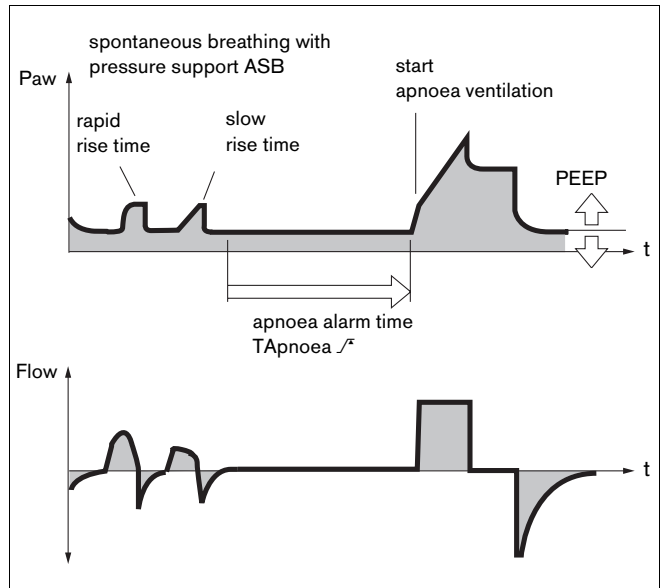
Set ventilation pattern with the controls below the screen:
— Maximum airway pressure »**Pmax**«
— O_2 concentration »**O2**«.

The following can be set on the screen:
— Positive end expiratory pressure »**PEEP**«.

The following can additionally be set on the screen for CPAP/ASB:
— Sensitivity »**Trigger**« (for synchronisation with the patient's spontaneous breathing efforts).
  Successful patient triggering is briefly indicated by an asterisk (*) in the middle of the top line of the screen.
— Pressure support »Δ **ASB**« above PEEP
— Pressure rise time »**Ramp**« (for pressure support Δ ASB)

CPAP, CPAP/ASB can be extended to include the following application modes:
— Apnoea ventilation, see page 49.
— NIV – Non-invasive ventilation, see page 51.

Setting alarm limits, page 53.
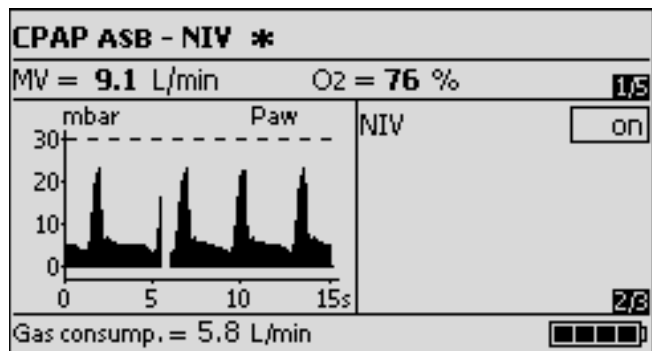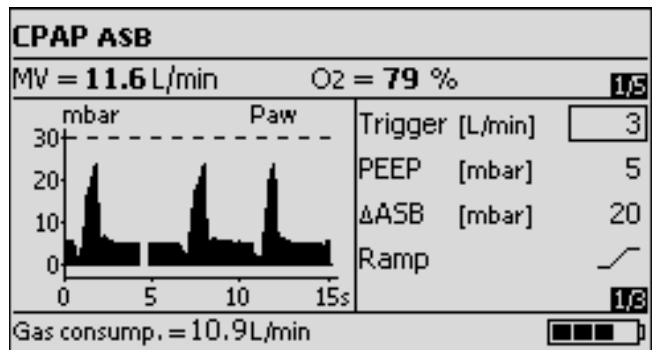
Apnoea ventilation

For automatically switching over to volume-controlled mandatory ventilation (SIMV) in the event of an apnoea – only effective in ventilation mode CPAP.
When an apnoea occurs, the device simultaneously outputs an alarm signal and starts volume-controlled mandatory ventilation with the parameters frequency **»f$_{Apnoea}$«**, tidal volume **»VT$_{Apnoea}$«** and the maximum airway pressure **»Pmax.«** upon expiry of the set alarm time "T$_{Apnoea}$". The ventilation time ratio I:E is invariably set to 1:1.5. The plateau time **»Tplat«** is 0. The patient can breathe spontaneously during apnoea ventilation. The mandatory frequency **»f$_{Apnoea}$«** remains constant.
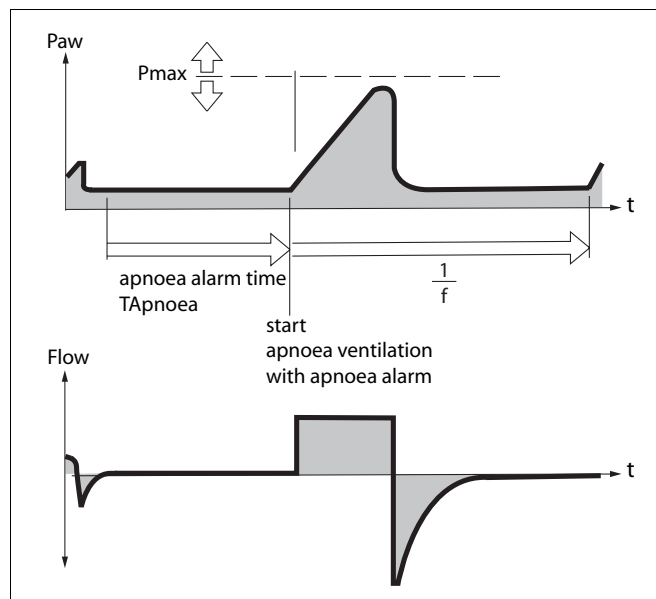
Setting apnoea ventilation

On the screen:

1 Press »**Settings** ▷▷ « key until screen page 2/3 appears.

To switch apnoea ventilation on:

● Set »**T$_{Apnoea}$**« to a value between 15 and 60 seconds.

The parameters f$_{Apnoea}$ and VT$_{Apnoea}$, which are required for setting apnoea ventilation, are now displayed:

● Set »**f$_{Apnoea}$**« and »**VT$_{Apnoea}$**«.

2 The selected maximum airway pressure »**Pmax**« must be such as to allow pressure to build up for the volume-controlled ventilation stroke.

The ventilation time ratio I:E = 1:1.5 and the plateau time Tplat = 0 are invariable during apnoea ventilation.

To switch apnoea ventilation off:

● Set »**T$_{Apnoea}$**« to off.
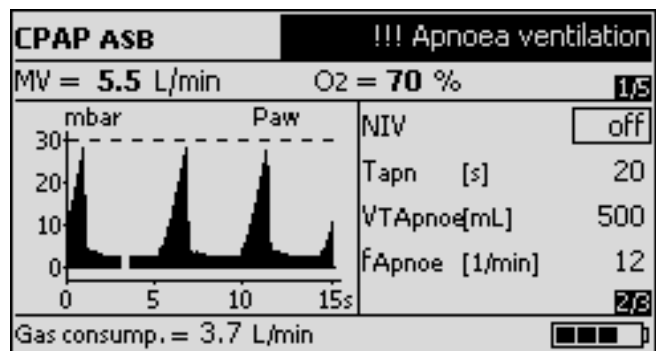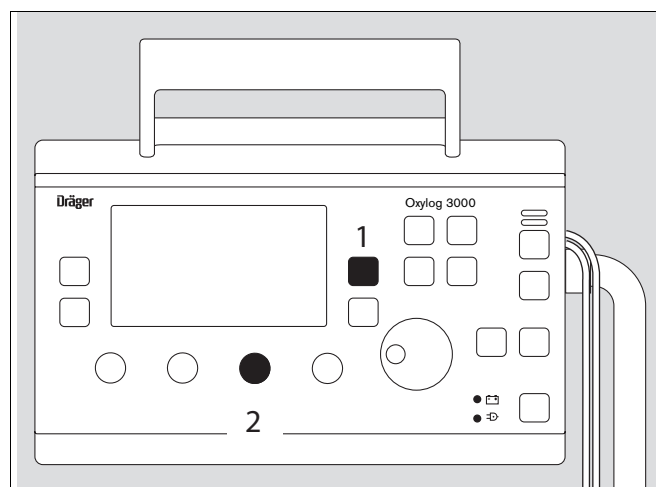
To end apnoea ventilation:

● Press the »**Alarm Reset**« key.

The ventilator continues operation with the original ventilation mode and with the original ventilation parameters set (CPAP).

The manufacturer's settings f_{Apnoea} = 12 1/min and VT_{Apnoea} = 500 mL can be changed in "Customer Service Mode", see page 76.

> **NOTE:**
> Apnoea ventilation can only be activated in ventilation mode CPAP without NIV. Apnoea ventilation is not available in any of the other pressure-controlled ventilation forms.
>
> The minimum ventilation required by the patient must be assured via the lower alarm limit MV ▼⁄ .

Setting alarm limits, page 53.

NIV – Non-invasive ventilation
Mask ventilation

NIV can only be activated as a supplementary function in the pressure-controlled ventilation modes BIPAP (PCV+), BIPAP/ASB (PCV+/PS), CPAP, CPAP/ASB (CPAP/PS). Mask leakages are detected by the device, compensated and included in the displayed flow curve and measured values for VT and MV.

> **NOTE:**
> The measured values for VT and MV will be incorrect during ventilation with leakages without active NIV function.

Use of NIV

> **CAUTION!**
> The dead space increases when using masks.
> Note the mask manufacturer's directions!

> **CAUTION!**
> Application mode **»NIV«** must not be activated with intubated patients!

> **CAUTION!**
> Check alarm limits after deactivating **»NIV«** mode!

> **CAUTION!**
> Avoid high airway pressure – risk of aspiration!

To switch on NIV
● Press »**Settings** ▷▷ « key until screen page 2/3 appears.
● Activate line »**NIV off**«
● Select »**on**« and confirm
The supplement NIV appears in the top line of the screen.

Oxylog 3000 automatically adjusts to the requirements of mask ventilation. Leakage flows are compensated automatically and the leakage alarm is inactive.
● The minimum ventilation required for the patient must be assured by setting the lower alarm limit »**MV** ▾/ «.

Apnoea ventilation is not permitted by the ventilator when NIV is active.
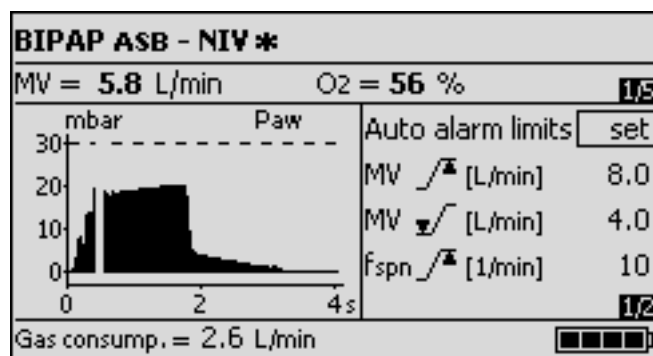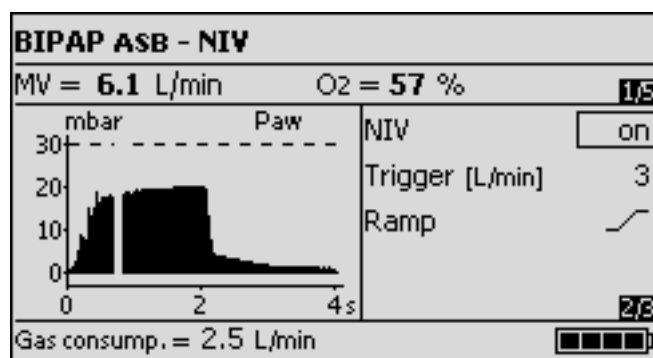
O$_2$ concentration with "O$_2$ blending"

(40 % to 100 %)

The O$_2$ concentration can be varied between 40 % and 100 %, regardless of the ventilation mode. When supplied with 100 % oxygen, lower inspiratory O$_2$ concentrations of down to 40 % can be produced by drawing in ambient air, with the injector principle realized in the Oxylog 3000.

However, the minimum O$_2$ concentration which can be realized, is dependent on the mean airway pressure and the inspiratory flow.

The mean O$_2$ concentration realized is displayed in the measured values window as a calculated value, based on the measured air intake and total flow.

The O$_2$ concentration is a calculated value and not based on one which has been measured by an O$_2$ sensor for the inspiratory O$_2$ concentration FiO$_2$!

If Oxylog 3000 can not achieve the set O$_2$ concentrations, it will signal "**! Check settings O$_2$**" and prompt the user to correct the setting.

Then

● Correct setting via control "**O$_2$**".

When the O$_2$ concentration has been set, the measured value will be displayed after approx. 30 seconds.
The message "**! Check settings O$_2$**" is displayed with a delay after setting the value.

When patients are breathing spontaneously, the achievable O$_2$ concentration will depend on the profile of the inspiratory flow. Even if this profile is changed, the message "**! Check settings O$_2$**" may appear after some time if the desired concentration can not be reached..

WARNING!

In toxic surroundings:

— **The patient must be ventilated with 100 % O$_2$ in order to ensure that toxic constituents are not entrained into the breathing gas.**

— **The patient must immediately be transferred to a breathable atmosphere in order to prevent inhalation of toxic air when spontaneous breathing resumes.**

WARNING!

Ventilation with increased oxygen concentrations may be harmful for the patient. Oxygen should be administered by medical professionals only.

O$_2$ (%) — O$_2$ concentration which can be realized at a P$_{mean}$ of 5 cmH$_2$O — 80 (%) — Flow (L/min.) — FiO$_2$ = f(Flow, Paw)

O$_2$ (%) — O$_2$ concentration which can be realized at a P$_{mean}$ of 15 cmH$_2$O — 82 (%) — Flow (L/min.) — FiO$_2$ = f(Flow, Paw)

O$_2$ (%) — O$_2$ concentration which can be realized at a P$_{mean}$ of 30 cmH$_2$O — 85 (%) — Flow (L/min.) — FiO$_2$ = f(Flow, Paw)

O$_2$ (%) — O$_2$ concentration which can be realized at a P$_{mean}$ of 60 cmH$_2$O — 93 (%) — Flow (L/min.) — FiO$_2$ = f(Flow, Paw)
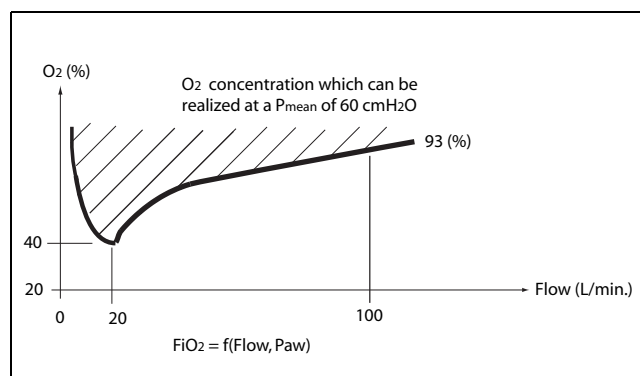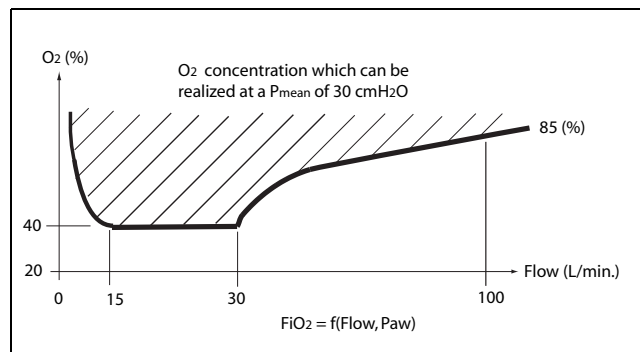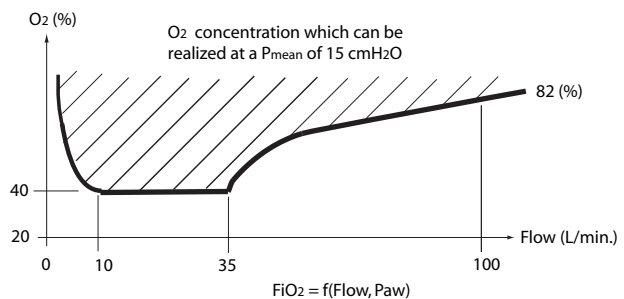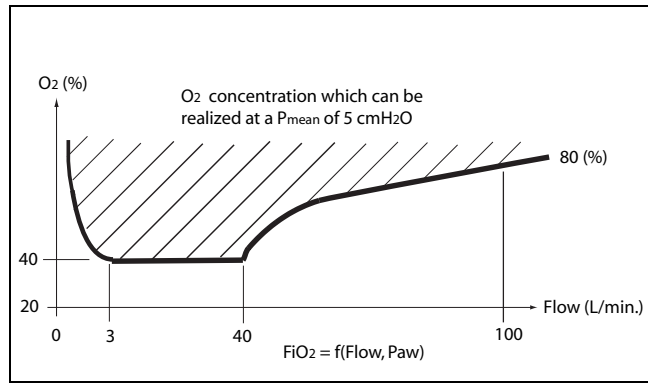
Setting alarm limits

Upper alarm limit for Paw
Pressure limitation with Pmax

Regardless of the set ventilation mode, the airway pressure is controlled by the ventilator and limited to the set maximum inspiratory pressure Pmax. Pmax appears in the pressure curve as a dashed line. When this dashed line is reached, Oxylog 3000 outputs a »**!!! Paw high**« alarm. The volume-controlled stroke cannot be applied completely (ventilation with inconstant volume).

1 Set the maximum airway pressure Pmax via the »**Pmax**« control.

The airway pressure is limited by Oxylog 3000 when Pmax is reached; inspiration is not ended prematurely.
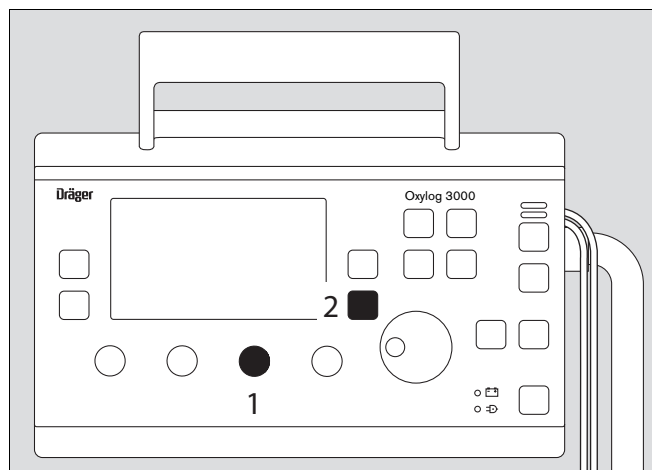
Lower alarm limit for Paw

A lower alarm limit need not be set for the airway pressure Paw. Oxylog 3000 automatically generates an alarm when it no longer detects a pressure difference of more than 5 mbar between inspiratory and expiratory pressure.

To set alarm limits for MV and fspn

2 Press key »**Alarms** ▷▷ «.
Display example »**Alarms**« screen with variable alarm limits

$\quad$ ▼⌐ = lower alarm limit

$\quad$ ⌐▲ = upper alarm limit

Alarm	Range
MV ⌐▲	2 to 41 L/min
MV ▼⌐	0.5 to 40 L/min
fspn ⌐▲	10 to 100 1/min
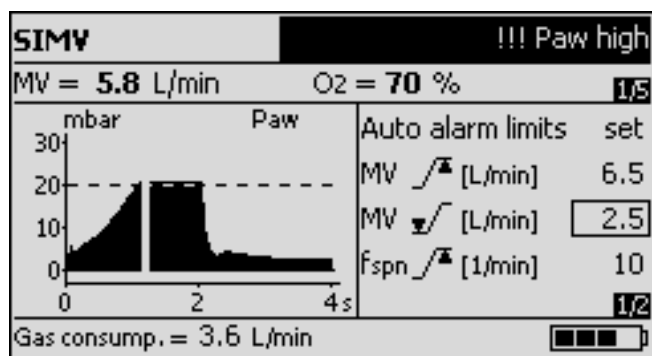
Example: Setting the upper alarm limit for MV.
● Select and activate the line »**MV** ⌐▲ « on the screen.
● Set and confirm the value.

Setting alarm limits automatically

The function »**Auto alarm limits**« sets the alarm limits on the basis of the following actual measured values at the time of activation:

MV $\quad$ ⌐▲ $\quad$: Measured value MV +2 L/min

MV $\quad$ ▼⌐ $\quad$: Measured value MV –2 L/min

fspn $\quad$ ⌐▲ $\quad$: Measured value Frequency +5 1/min

This automatic selection of alarm limits is performed only **once** when confirmed via the rotary knob. The alarm limits refer to the current measured values for MV and fspn.

In the Event of an Alarm

1 the red lamp flashes
or
2 the yellow lamp flashes.
3 The alarm message appears on the right of the top
line on the screen.

Oxylog 3000 assigns corresponding priority to the
alarm message, highlights the text with the appropriate
number of exclamation marks and generates different
tone sequences for the respective alarms.

!!! = Warning

!! = Caution

! = Advisory
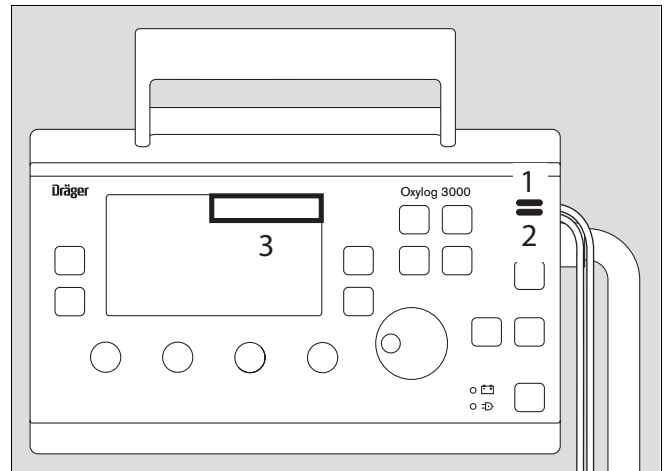
Warning

An alarm with top priority

1 Red alarm lamp flashes.

Warnings are highlighted by three exclamation marks
and displayed in inverted form.

Example: !!! Apnoea

Oxylog 3000 generates a sequence of five tones which
sounds twice and is repeated every 7.5 seconds.

Caution

An alarm of medium priority.

2 Yellow alarm lamp flashes.

Caution messages are highlighted by two exclamation
marks.

Example: **!! No int. battery ?**

Oxylog 3000 generates a three-tone sequence which is
repeated every 20 seconds.

Advisory

Low-priority alarm.

1 Yellow alarm lamp lights up.

Advisory messages are identified by one exclamation mark.

Example:

! Settings not confirmed

Oxylog 3000 generates a two-tone alarm sequence which only sounds once.

● Refer to the list "Fault – Cause – Remedy" on page 55 for information on how to remedy the faults.

When the fault has been remedied

the alarm tone is cancelled.

Alarms which have been remedied remain on display and can be acknowledged (reset):

2 Press the »**Alarm Reset**« key.

3 The alarm message is deleted from the screen.

Every alarm which has been remedied but not acknowledged will be overwritten and cancelled by a new alarm or advisory message.

Suppress alarm tones

for max. 2 minutes:

4 Press key » 🔕 « its yellow lamp lights up and all alarm tones are suppressed for approx. 2 minutes. Alarm tones are once again output by the device after these 2 minutes.

> **CAUTION!**
> In case an alarm is silenced and a new alarm occurs, this new alarm is also silenced.

If alarm tones are to be heard again before the 2 minutes have expired:

4 Press key » 🔕 « again and its lamp goes out.

In the event of a gas failure

> **CAUTION!**
> Oxylog 3000 cannot continue ventilation and outputs the alarm »**!!! Supply pressure low**«.
> Continue ventilation immediately with a separate ventilator to ensure that the patients is still ventilated.

In the event of an internal power failure

> **CAUTION!**
> Automatic ventilation, volume measurement, and alarms do not operate in the event of a power failure!
> An audible alarm is output to indicate the internal power failure.
> Spontaneous breathing can continue through the integrated demand valve.
> Immediately start ventilating the patient with an independent manual ventilation device (resuscitation bag) using PEEP and/or increased inspiratory oxygen concentration where necessary and appropriate.
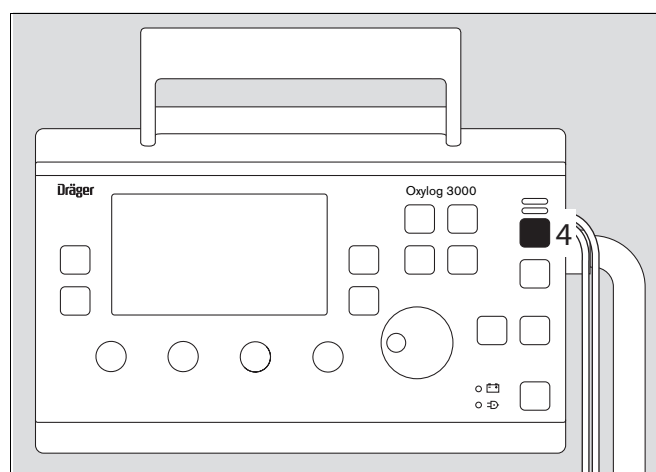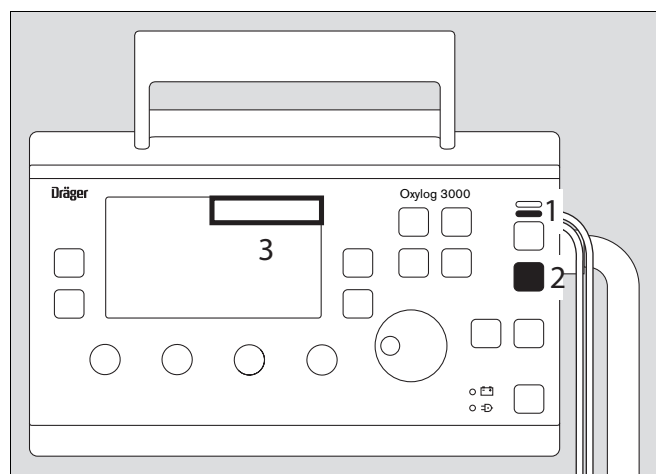
Displaying curves and measured values

The main page

displays the airway pressure curve Paw (t) or flow curve Flow (t) and two relevant measured values.

To display a different curve

1　Press »**Curves** ◣◼ᴛ « key.
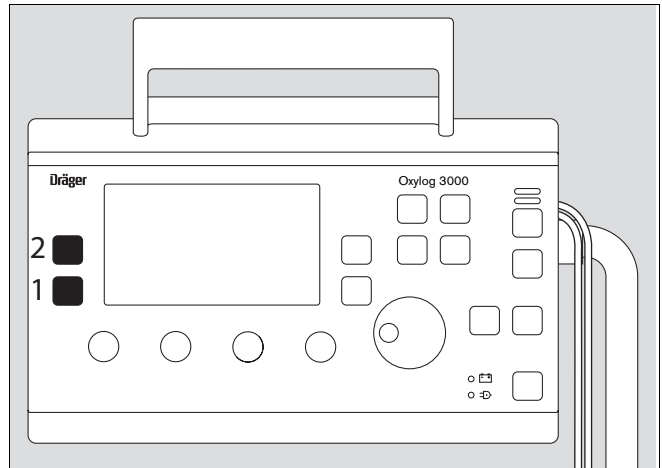
Example: airway pressure curve Paw (t)
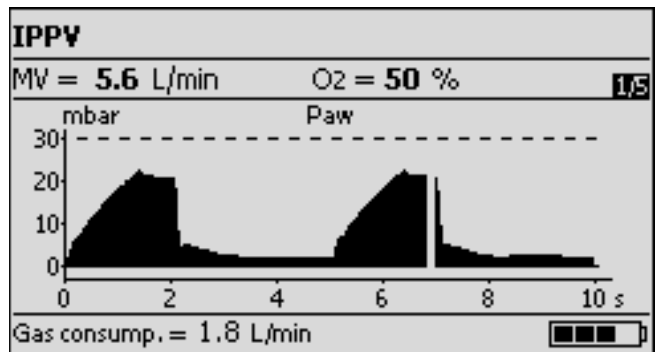
Example: flow curve (t)
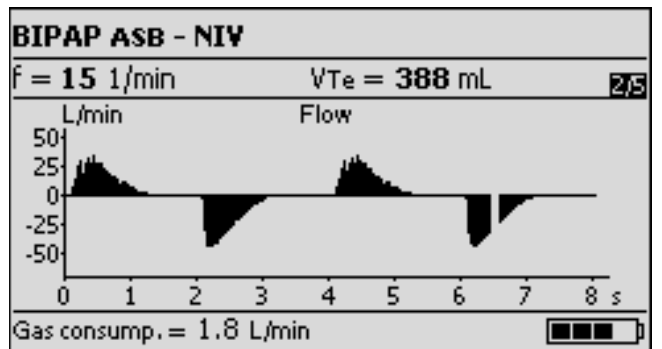
Displaying other measured values

2　Press »**Values** ▷▷ « key: the next page is displayed on the device.

The following pairs of measured values are displayed in the default setting:

1. MV, O₂

2. f, V_Te

3. PEEP, Pmean

4. Ppeak, Pplat

5. MV_spn, f_spn

The displays can be configured as required in Customer Service Mode, page 79.

Special functions

Manual inspiration / Inspiration hold

Inspiration Hold for volume-controlled strokes:

Regardless of the time at which it is started, an automatic ventilation stroke can be extended for up to max. 15 seconds (in IPPV, IPPVAssist, SIMV, SIMV/ASB).

Or

manual inspiration:

A ventilation stroke can be started manually between two automatic strokes and held for up to max. 15 seconds.

The pattern of the manually started ventilation stroke corresponds with the set ventilation mode.

For IPPV (CMV), SIMV:
Volume-controlled ventilation stroke determined by the settings »V_T« and »**Tinsp**«, as well as »**I:E**«.

For BIPAP (PCV+) , BIPAP/ASB (PCV+/PS):
The pressure-controlled ventilation stroke is determined by the settings »**Pinsp**« and »**Tinsp**«.

For CPAP/ASB (CPAP/PS):
The pressure-controlled ventilation stroke is determined by the setting »Δ **ASB**«.

To activate Manual inspiration or Inspiration hold

1 Press key »**Insp. hold**« for as long as inspiration is required.

Oxylog 3000 will either extend the momentary automatic ventilation stroke accordingly or start a new ventilation stroke and hold it for up to max. 15 seconds.

100 % O₂ (optional)

To apply 100 % O₂ for 3 minutes regardless of the momentarily set value.

2 Briefly press »**100** % **O₂**« key; its LED lights up for 3 minutes.

The set value is resumed by the ventilator upon expiry of these 3 minutes, or when the »**100** % **O₂**« is pressed again. The LED dims.

When medical air is selected as input source, the »**100** % **O₂**« function will not deliver pure oxygen.
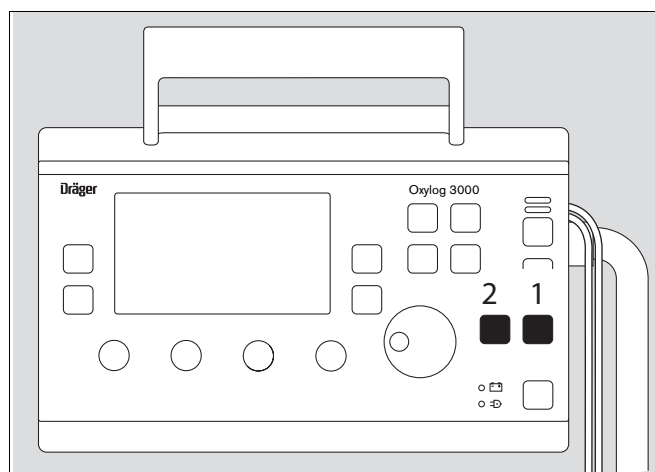
O2 inhalation (optional)

> **WARNING!**
> **The O2 inhalation function is not a ventilation mode!**
> **It may only be used for patients with spontaneous breathing who receive a constant O2 flow of between 0 and 15 L/min via a mask.**

If stenosis occurs, the flow is interrupted by the ventilator for 500 ms at an airway pressure of 30 mbar and the airway pressure is reduced to 0 mbar.
The »**!!! Paw high**« alarm is active.

● The spontaneously breathing patient may only be connected to the device via an inhalation mask.

To activate O2 inhalation:
1 Press and hold key »**O2-Inhalat.**« for approx. 3 seconds
   or
1 briefly press key »**O2-Inhalat.**« and confirm.
2 Connect the inhalation mask to the inspiration socket.
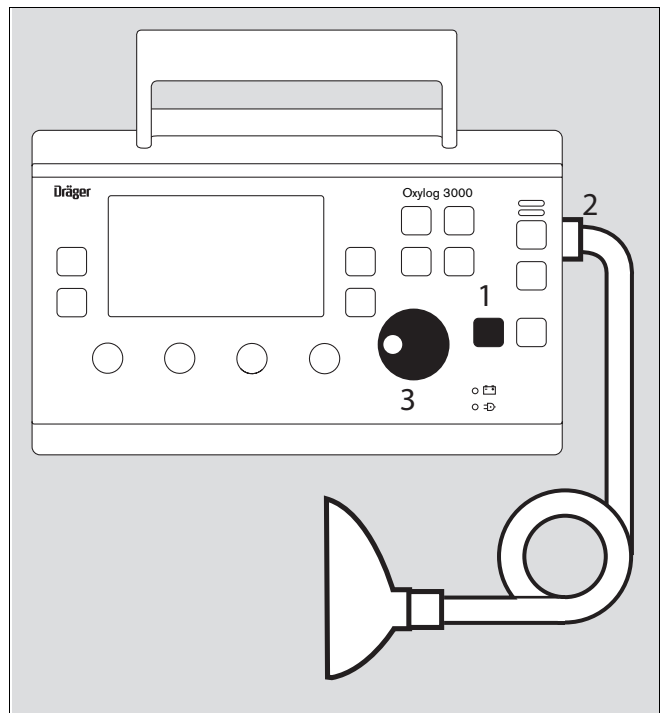
Display (example): »**O2-Inhalation**«
O2 inhalation is performed with the previously effective setting.
3 Set and confirm the required O2 flow via the central rotary knob.
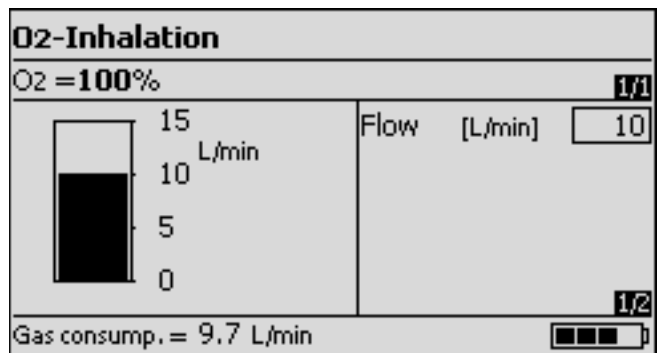
Calibration

The pressure sensors and flow measurements are automatically calibrated by the device at regular intervals.

The saved calibration values are retained even when the device is switched off.

Screen brightness

The screen brightness levels can be defined independently of the ventilation mode for battery and mains operation on the last page of the »**Setting**« menu:

— The setting »**Brightness** /▲ « is active in both mains and battery operation when making settings on the ventilator.

— The setting »**Brightness** ▼/ « is active when operating with replaceable battery.
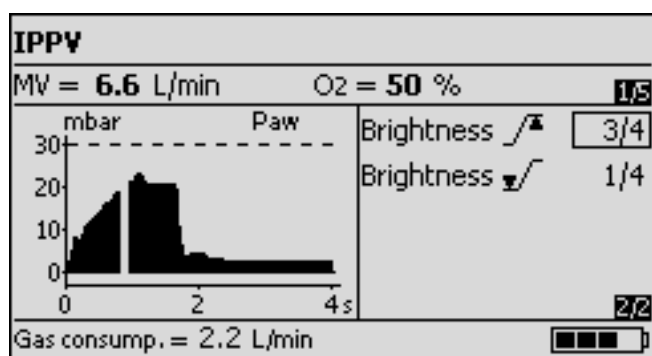
Shutdown

After disconnecting the patient:

Switch ventilator off:

1 Press key »⏻« for 3 seconds. Its yellow lamp flashes and ventilation is subsequently ceased by the device.

2 The alarm »**!!! Confirm device OFF with rotary knob**« must be acknowledged.

When O2 is supplied from a cylinder:

NOTE:

The cylinder valve must be closed completely in order to avoid gas flows due to leakage by the device.

When medical gas is supplied from the pipeline system:

● Unplug probe.
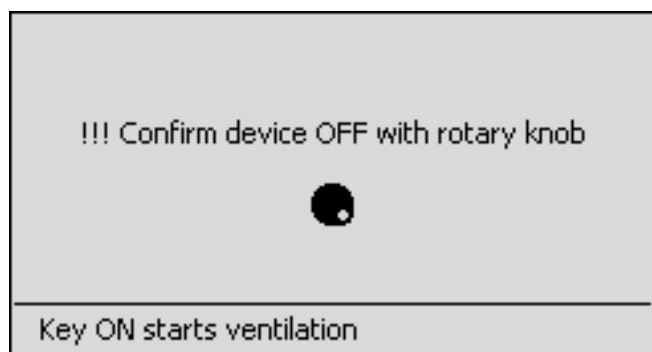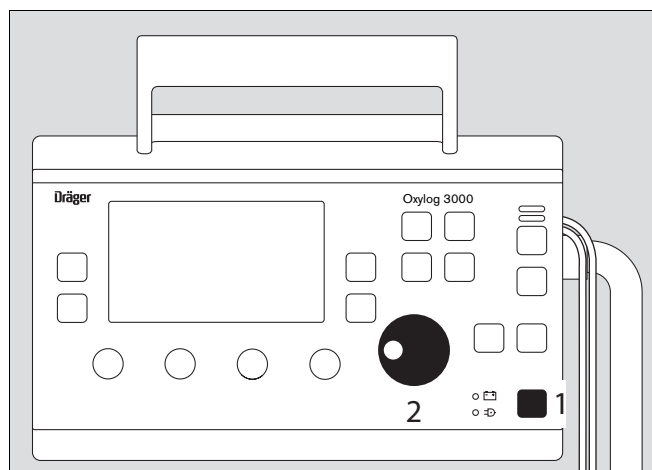
Displaying configuration and information

The following settings can be made for the application concerned via »**Configuration and information**«:

— Select language
— Select gas supply (O_2 or medical air)

The settings made under "Configuration" are retained even when the ventilator is switched off.

The following ventilator data can be displayed via »**Configuration and information**«:

— Identification No. (device ID)
— Total hours of operation (Total working hours)
— Hours of operation since the last inspection and maintenance (Hours since service time)
— Battery type and battery capacity

Configuration can be ended at all times by pressing the »**Alarm reset**« key or by startup of ventilation.

Set configuration parameters /display information

1 Switch Oxylog 3000 on = press the »⏻« key.
   The device runs through a self-test and the operator is prompted, on the display, to call up the configuration menu or device check:
   »**Press rotary knob for device check and configuration**«
2 Confirm.
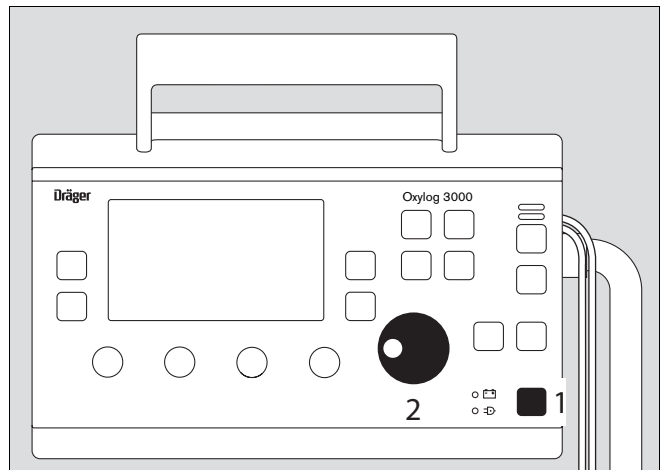
The main menu is then displayed:

● Select and confirm »**Configuration and information**«.
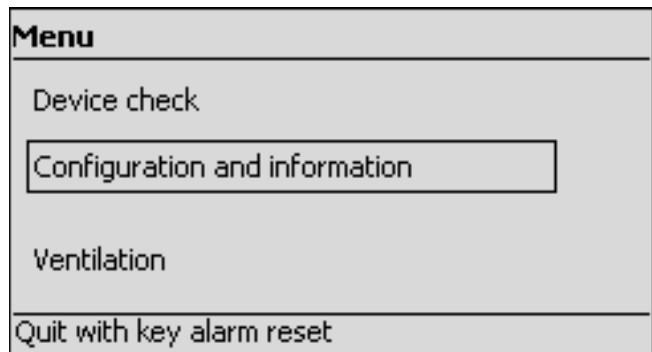
Set language
- Press key »**Settings** ▷▷ « to select the menu »**Configuration and information** `1/2` «.
- Select and activate line »**Language**«.
- Select language and confirm.

The new language selected is immediately effective.

Configuration

Language = English	Gas supply = O2
Device-ID:	11776329
Working hours:	231 h
Hours since service-time:	0 h

`1/2`

Continue with key adjustment / quit with reset

06637171

Set gas supply
- Press key »**Settings** ▷▷ « to select the menu »**Configuration and information** `1/2` «.
- Select and activate line »**Gas supply**«.

O2 or medical air can be set.
- Set and confirm the required gas supply.

When medical air is selected, Oxylog 3000 will deliver a concentration of 21 % regardless of the set O2 concentration. However, the control »**O2**« can be set to 40 %, for example. In this way, Oxylog 3000 will use less medical air by additionally drawing in ambient air.

Configuration

Language = English	Gas supply = O2
Device-ID:	11776329
Working hours:	231 h
Hours since service-time:	0 h

`1/2`

Continue with key adjustment / quit with reset

06637171

Display battery type
- Press key »**Settings** ▷▷ «to select the menu »**Configuration and information** `2/2` «.

The performance data of the inserted battery are displayed on the device.

Information

Manufacturer.:	EONE MOLI		
Battery type:	LION ME202AF		
Date:	07/01	Batt. cycles:	7
Design Cap.:	5400 mAh	Act.capacity:	100 %

`2/2`

Continue with key adjustment / quit with reset

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Fault – cause – remedy

Fault – cause – remedy

Oxyog 3000 classifies error messages according to three priority levels and identifies these accordingly with the aid of exclamation marks:

!!! Warning = Message with top priority

!! Caution = Message with medium priority

! Advisory = Message with low priority

The messages are listed in alphabetical order. The following list is intended to assist in identifying and rectifying the underlying cause of any faults triggering an alarm.

Messages in the Alarms window

	Message	**Cause**	**Remedy**
!	**21% oxygen**	The device has been set to medical air and may only be operated with medical air.	
!!!	**Apnoea**	Spontaneous breathing by the patient has failed, or disconnection.	Ventilate in IPPV (CMV) mode. Ensure that hose connections are tight.
		Faulty flow sensor.	Replace flow sensor.
!!!	**Apnoea ventilation** (only for CPAP)	The ventilator has automatically switched over to mandatory ventilation after detecting an apnoea (only in CPAP mode).	Check ventilation mode. Return to original ventilation mode: Press the »**Alarm Reset**« key.
!!	**Charge int. battery**	Oxylog 3000 draws its power from the internal battery due to the absence of an external DC supply. Only a few minutes of operating time remain (typically 10 minutes).	The ventilator must immediately be reconnected to the mains supply, an onboard DC supply or a fully charged battery.
!!	**Check settings flow**	The flow resulting from the settings for "Tidal volume V_T per unit time" is impossible.	Change tidal volume V_T or inspiratory time **Tinsp** or ventilation time ratio **I:E**.
!	**Check settings O2** (only for optional "O2 blending")	The set O_2 concentration cannot be achieved with the set flow.	Adjust inspiratory flow or O_2 concentration (in accordance with measured value).
!!	**Check settings time**	The expiration time resulting from the settings for **Freq.** and **I:E** or **Tinsp** is impossible.	Change **Freq.** or **I:E** or **Tinsp.**
!!!	**Confirm device OFF with rotary knob**	Key »⏻« has been pressed for 3 seconds.	To switch off: confirm. To continue ventilation, press key »⏻« again.
!!!	**Device failure**	Technical defect.	Call DrägerService.
!!	**Flow measurement inop**	Measurement hoses for flow measurement on patient side buckled, disconnected or leaking.	Ensure measurement hoses for flow measurement on patient side are connected correctly.
		Flow sensor defective.	Replace flow sensor.
		Technical defect.	Call DrägerService – only restricted operation is now possible.
!!	**Gas delivery failure**	Technical defect.	Call DrägerService – only restricted operation is now possible.

	Message	Cause	Remedy
!!	**High frequency**	Patient breathes at a high spontaneous rate.	Check patient's condition, check ventilation pattern, correct alarm limit **f$_{spn}$** if necessary.
!!	**Int. battery charging inop**	Technical defect.	Call DrägerService – only restricted operation is now possible.
!!!	**Int. battery discharged**	The operating time for operation with the internal battery has expired and an external DC supply has not been connected.	The ventilator must immediately be reconnected to a mains supply, an on-board DC supply or a fully charged battery.
!!	**Int. battery in use**	Oxylog 3000 draws its power from the internal battery due to the absence of an external DC supply.	Press »**Alarm Reset**« key to confirm alarm.
!!	**Key failed**	Technical defect.	Call DrägerService – only limited operation is now possible.
!!!	**Leakage** (not in NIV)	The measured expiratory tidal volume V$_T$ is approx. 40 % lower than the inspiratory value.	Repair leaks in patient system and possibly in tube. Use new flow measuring hoses.
		Faulty flow sensor.	Replace flow sensor.
		The ventilator may not function properly.	Call DrägerService.
!!	**Loss of data**	Technical defect.	Call DrägerService – only restricted operation is now possible.
!!	**Loudspeaker inop**	Technical defect.	Call DrägerService – only restricted operation is now possible.
!!!	**MV high**	The upper alarm limit for the minute volume MV has been exceeded.	Check patient's condition, check ventilation pattern, adjust alarm limits if necessary.
		Faulty flow sensor.	Replace flow sensor.
		The ventilator may not function properly.	Call DrägerService.
!!!	**MV low**	The minute volume MV has dropped below its lower alarm limit.	Check patient's condition, check ventilation pattern, adjust alarm limits if necessary.
		Leak in breathing system.	Ensure connections in breathing system are tight.
		Faulty flow sensor.	Replace flow sensor.
		The ventilator may not function properly.	Call DrägerService.
!!	**No int. battery ?**	Internal battery not fitted, faulty or wrong battery fitted.	Fit battery or confirm alarm or change internal battery.
!	**No int. battery ?**	Internal battery not fitted, faulty or wrong battery fitted.	Advisory message, is displayed continuously when confirmed, change internal battery.
!	**No int. battery charging**	Internal battery cannot be charged.	Press »**Alarm Reset**« key to confirm alarm.

	Message	Cause	Remedy
!!!	**Paw high**	The alarm limit Pmax for the airway pressure has been reached. Patient "fights" the machine, coughing.	Check patient's condition, check ventilation pattern, adjust alarm limits if necessary.
		Ventilation hose kinked, stenosis.	Check hose system, breathing valve, tube.
!!!	**Paw low**	No pressure difference >5 mbar between inspiration and expiration or set pressure level is not achieved. Leak in cuff.	Inflate cuff and check for leaks.
		Leakage or disconnection.	Check hose system for leaking connections. Ensure that the breathing valve has been fitted correctly.
!!	**Paw measurement inop**	Fault in measurement hoses for flow measurement on patient side.	Ensure measurement hoses for flow measurement on patient side are connected correctly.
		Technical defect.	Call DrägerService – only restricted operation is now possible.
!	**Self test o.k.**	The device has been switched on and the self-test completed successfully.	The message can be confirmed or it will be cancelled automatically with the next message.
!	**Settings not confirmed**	Parameters have been changed on the screen but not confirmed.	Press the rotary knob to confirm the parameter changes.
!!!	**Supply pressure low**	Supply pressure <270 kPa.	Ensure that supply pressure exceeds 270 kPa.

Messages in the information window

(Numerical examples)

Message	Cause	Explanation/Remedy
f = 12 per min or **V$_T$ = 800 mL** **I : E = 1 : 1.5** **Flow = 15 L/min**	Change in Tinsp, f or V$_T$ in ventilation mode SIMV.	
f = 12 per min or **V$_T$ = 800 mL** **Tinsp = 0.7 s** **Flow = 35 L/min**	Change in I/E, f or V$_T$ in ventilation mode IPPV (CMV), IPPVAssist (CMV$_{Assist}$)	
I : E = 1 : 1.5 **Texp = 2 s**	Change in Tinsp or f in ventilation mode BIPAP (PCV+).	
PEEP > 10 mbar?	PEEP >10 mbar has been set but not confirmed.	The required setting of PEEP >10 mbar is only possible when confirmed via the central rotary knob.
Gas consumption = 10 L/min	Standard display in information window for the current gas consumption.	
▮▮▯▭ (Battery capacity)	Standard display in information window for the current battery capacity.	
Pinsp >=PEEP + 3 mbar !	Set PEEP+ 3 mbar >Pinsp.	Set Pinsp > PEEP+ 3 mbar.
P$_{ASB}$ = 22 mbar	Change in Δ ASB or PEEP.	P$_{ASB}$ is the absolute pressure resulting from PEEP + Δ ASB.

Cleaning

Cleaning

- Clean breathing valve, flow sensor, angled connector and ventilation hoses of the reusable hose set whenever they have been used.
- Always exchange single use patient circuit after use on a patient.
- The disposable hose set must always be disposed of correctly after use.
- Clean ventilator and medical gas hoses if heavily soiled.

.

> **WARNING!**
> **Always follow hospital/EMS procedures for handling equipment contaminated with body fluids.**

> **WARNING!**
> **Always follow local regulations governing the disposal of infectious waste and materials contaminated with body fluids.**

Disassemble reusable ventilation set

1 Disconnect ventilation hose from socket.
2 Disconnect flow measuring hoses from sockets.
3 Unscrew medical gas hose from Oxylog 3000.

> **CAUTION!**
> When disconnecting the ventilation hose, always grip the sleeve and not the corrugations!
> If this is not done, the corrugations or hose may be torn from the sleeve.
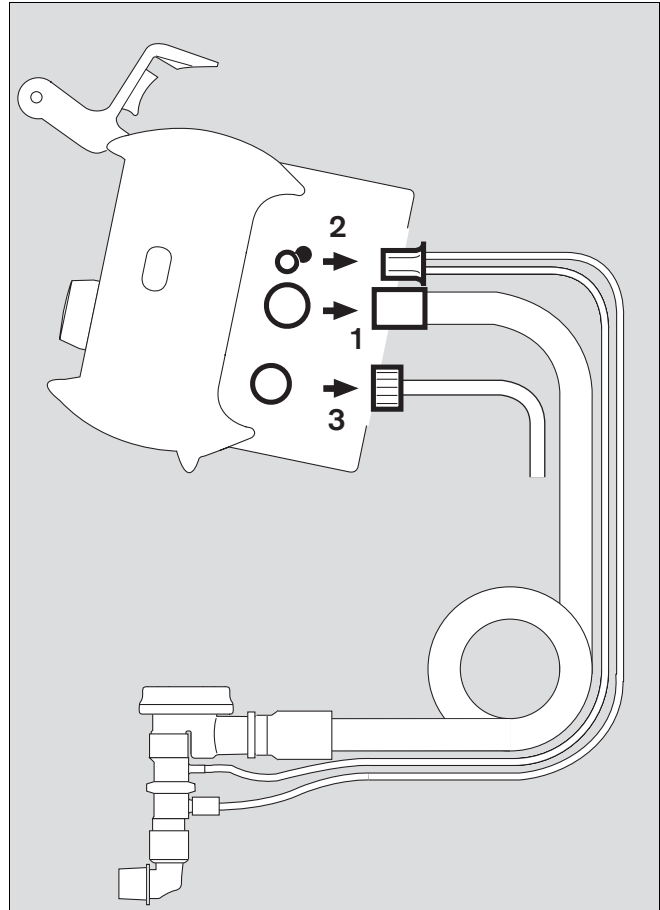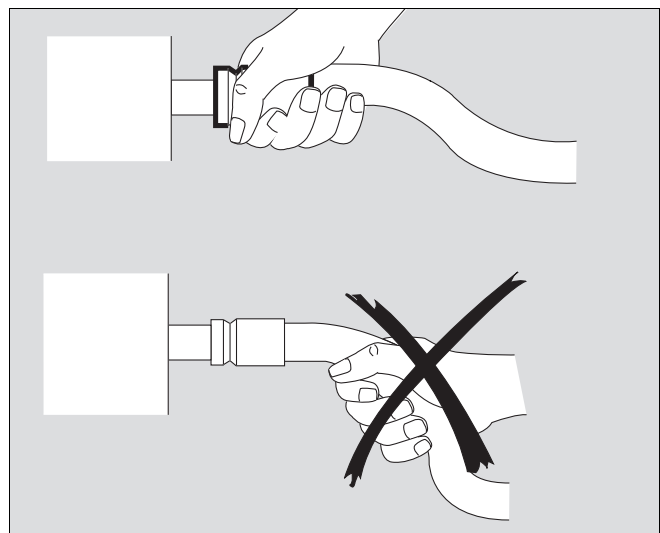
1 Disconnect flow sensor from breathing valve.

CAUTION!
Do not twist or use force on the hose nozzles, as this can damage the flow sensor.

2 Carefully detach flow measuring hoses from flow sensor, pulling in the axial direction of the hose nozzles.

3 Detach angled connector from flow sensor.

CAUTION!
Do not allow any objects to enter the flow sensor. Do not purge with compressed air. The wind vane inside may be damaged and cause measuring errors!

4 Detach ventilation hose from breathing valve.
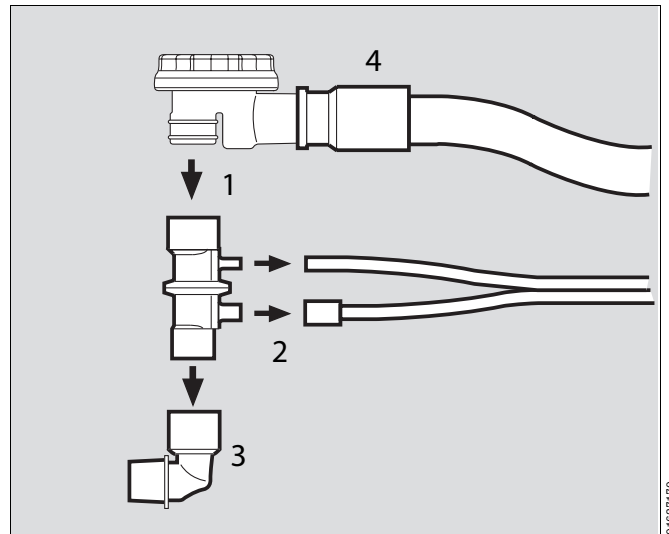
Breathing valve, disassembly

5 Turn cover about 90° anticlockwise = unlock and remove cover.

6 Remove silicone diaphragm.

● Do not disassemble breathing valve any further!

CAUTION!
Do not allow any objects to enter the housing of the breathing valve!
Do not damage the silicone diaphragm and other parts.
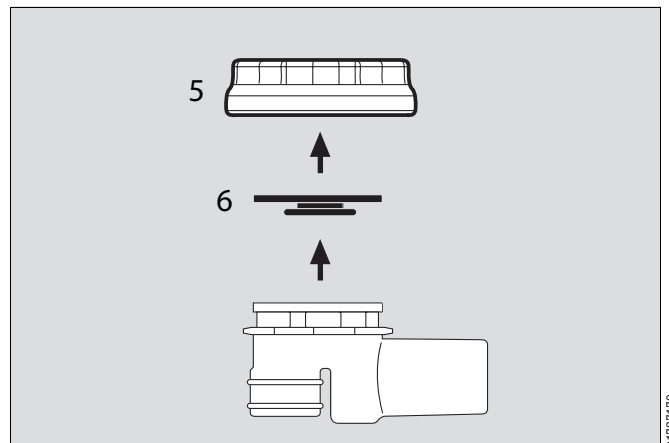
CAUTION!
The rubber disc in the housing must not be removed, damaged or bent, otherwise the valve will not work properly and endanger the patient.
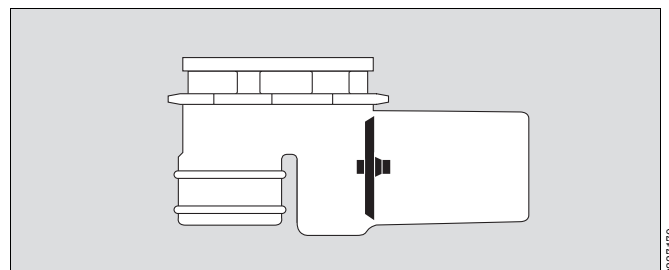
Remove disposable hose set

1 Disconnect flow measuring hoses.

2 Disconnect ventilation hose.

● Correctly dispose of the complete disposable hose set.

CAUTION!

The disposable ventilation hose set must not be sterilized: it cannot withstand high temperatures and may be damaged!
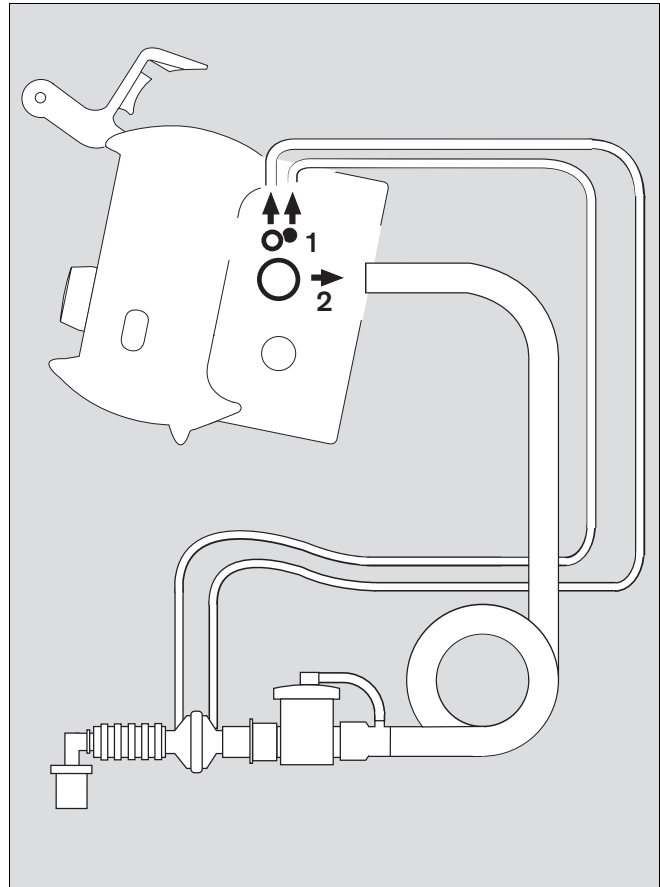
Cleaning and disinfecting

To ensure material compatibility, use disinfectants based on:

— aldehydes

— alcohols

— quaternary ammonia compounds.

CAUTION!

Disinfectants based on:

— compounds containing alkylamine

— compounds containing phenol

— compounds releasing halogen

— strong organic acids

— compounds releasing oxygen

may cause damage to materials, particularly those used for the breathing valve, flow sensor and angled connector.

CAUTION!

Sterilization of the ventilator itself with ethylene oxyde (EtO) is not recommended.

CAUTION!

Always follow accepted hospital/EMS procedures for disinfecting equipment contaminated with body fluids (protective clothing, eyewear, etc.).

Users in the Federal Republic of Germany are recommended to use only disinfectants on the current DGHM list (DGHM: German Society for Hygiene and Microbiology).

The following disinfectants on the DGHM list are recommended:

— Dismozon pur

— Incidur

— Sekusept Powder

— Trichlorol

The DGHM list (published by: mhp-Verlag, Wiesbaden) also specifies the active ingredient in each disinfectant. Disinfectants based on the active ingredients specified above are recommended for users in those countries in which the DGHM list is not available.

Disinfecting by wiping

Ventilator and medical gas hose:

● Follow the manufacturer's instructions. Remove heavy soiling with a disposable cloth first.

CAUTION!

Do not allow any liquid to enter the ventilator or medical gas hose! Risk of malfunction.

Bath disinfecting

Disassembled parts of the breathing valve, flow sensor, ventilation hose and flow measuring hoses:

CAUTION!

Follow the manufacturer's instructions.
Agitate parts thoroughly in the solution.
Do not clean with a hard brush!

CAUTION!

Do not allow any objects to enter the breathing valve or flow sensor! Risk of malfunction.

CAUTION!

Rinse parts thoroughly with distilled water.
Disinfectant residues can cause the rubber disc to become jammed in the breathing valve!

CAUTION!

Allow to dry completely. The breathing valve and flow measuring hoses may not function correctly if water remains in these parts!

Sterilising reusable hose sets

Disassemble the breathing valve, flow sensor and angled connector. When disassembling the breathing valve from the flow sensor, pull in one straight line. Do not rotate the parts, this may damage the flow sensor. Dismantle the breathing valve.

The disassembled parts of the breathing valve, the flow sensor, the angled connector, the flow measuring hoses and the ventilation hose

● can be sterilized in hot steam at 134 $^{\circ}$C in accordance with EN 285 (Sterilization – Steam sterilization – Large-scale sterilization) for at least 3 minutes, up to 10 minutes.

   The hose set can be sterilized 100 times maximum.

Sterilization longer than 10 minutes is permissible, but will shorten the service life of the hose set.

After care

● Reassemble, page 26.
● Connect to power supply, page 29 and gas supply, page 32.
● Check readiness for operation, page 35.

Note service life of the hose set

The parts of the breathing valve, the flow sensor, the angled connector, the flow measuring hoses and the ventilation hose are resistant to the recommended disinfectants and to the temperatures occurring during sterilisation.

However, every disinfection and sterilisation cycle also means wear for the parts concerned.
For this reason, the parts must be examined for cracks and permanent deformation after the care procedure.

NOTE:
Damaged or deformed parts must be replaced.

Maintenance intervals

● Must be carried out by trained service personnel
● Ventilator and parts must be disinfected and cleaned before starting any maintenance procedures, as well as before returning machine or parts for repairs!

Dust filter	must be replaced after 2 years can be treated as household waste
Internal battery	replace after 2 years or when the battery no longer remains charged for the specified operating time (battery operating time see page 86). Disposal as special waste.
Device inspection and maintenance	every 2 years

Batteries

> **WARNING!**
> **Do not burn batteries. Risk of explosion!**

> **WARNING!**
> **Do not open batteries forcibly.**
> **Risk of caustic burns!**

Batteries are special waste.
They must be disposed of in accordance with the local
waste disposal regulations.

In case of ventilator failure

> **CAUTION!**
> Never operate a ventilator if it has suffered physical
> damage or does not seem to operate properly. In this
> case always refer servicing to factory trained and
> authorized personnel.

Device disposal

— at the end of its useful life.

This device is subject to EU Directive 2002/96/EC
(WEEE). It is not registered for use in private
households, and may not be disposed of at municipal
collection points for waste electrical and electronic
equipment.
Dräger Medical has authorized a firm to dispose of this
device in the proper manner: for more detailed
information, please contact your local Dräger Medical
organization.

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Service Mode

Service Mode

Customer Service Mode

In service mode, the ventilator performs function tests, output status information and permits configuration of parameter settings.

Displays in service mode appear in English and cannot be changed to any other language.

001	Set startup settings	Configure start-up settings, restore manufacturer's default settings
002	Select hose type	Determine which ventilation hose set is used (disposable or reusable)
003	Set date and time (Greenwich Mean Time GMT)	Set date and time
004	Set measured values display window	Configure the layout of measured values in the measured values window; restore manufacturer's default settings
005	Enter activation code	Enter the activation code for options
006	Test buttons and potentiometer	Check correct functioning of push-buttons and controls
007	Test loudspeaker, buzzer, LEDs and display	Check correct functioning of loudspeaker, buzzer, LEDs and screen
008	Display accu and supply data	Show battery data and condition of the supply voltage
009	Display actual technical errors	Display any active technical errors
010	Display error and info logbook	Calibration logbook and technical errors in chronological order
011	Display settings logbook	Logbook of operating phases and ventilator settings
012	Display language text	Display screen texts in two freely selected languages

Ventilation is not possible in service mode.

To enter service mode

1,2 Turn controls »**VT**« and »**Freq**.« to right-hand stop.
3 Switch on the device = briefly press key »⏻« and simultaneously press and hold
4 »**Curves** ⌁ « key and
5 »**Values** ▷▷ « key until the main »**Customer Service Mode**« menu appears.
● Set the number of the required test in the main menu with the central rotary knob.
● Activate test = press rotary knob.
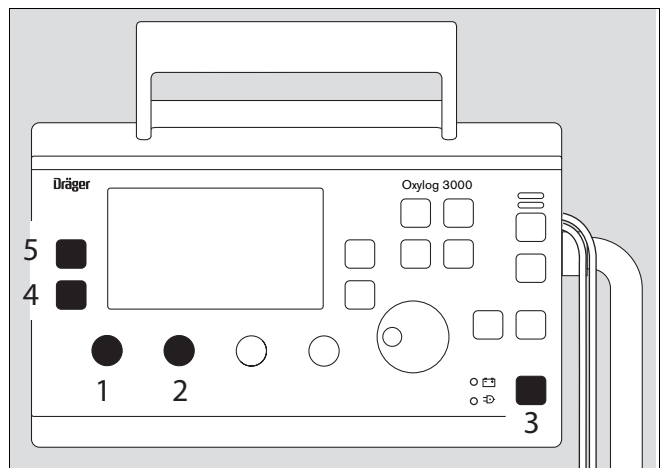
Settings in service mode

Select the required function with the cursor (asterisk).

- Select parameter = turn rotary knob.
- Activate parameter = press rotary knob.
- Set value = turn rotary knob.
- Confirm value = press rotary knob.

```
Customer Service Mode
Testnumber :      1

Set startup settings




Switch OFF to quit servicemode
Ver. 01.00 (22.10.2001)
```

Quit test

- Select line »**EXIT**« = press rotary knob and confirm.

The set values are saved and remain effective whenever ventilation is started after switching on.

```
Set startup settings

Mode    = IPPV

Trigger =    0 lpm
PEEP    =    5 mbar
I:E     = 1.0:1.5
Tinsp   =    2.0 s
Tplat   =    0 %
dASB    =    0 mbar
Ramp    = STANDARD
Pinsp   =   20 mbar
O2-Flow =   10 lpm

 Set factory default
*EXIT              Page 1/2
```

Set startup settings

The default settings for the parameters are displayed on the screen when the ventilator is switched on and can be adjusted.
Display (example):

```
Set startup settings

Mode    = IPPV

Trigger =    0 lpm
PEEP    =    5 mbar
I:E     = 1.0:1.5
Tinsp   =    2.0 s
Tplat   =    0 %
dASB    =    0 mbar
Ramp    = STANDARD
Pinsp   =   20 mbar
O2-Flow =   10 lpm

*Set factory default
 EXIT              Page 1/2
```

Switch over to the second page:

- Select line »**Page**«, confirm and turn rotary knob.

Display (example):

```
Set startup settings

NIV        = OFF
Tapn       =    0 s
VTapn      =  500 ml
fapn       =   12 bpm
MVspn-high = 40.0 lpm
MVspn-low  =  0.5 lpm
fspn-high  =  100 bpm

Loudness       = 3/4
Brightness-min = 1/4
Brightness-max = 3/4

 Set factory default
 EXIT         *Page 2/2
```

To restore the manufacturer's defaults:
● Select and confirm line »**Set factory default**«.

Range of settings:

Parameter	Range
Trigger	0 to 15 Lpm
PEEP	0 to 20 mbar
I:E	3:1 to 1:4
Tinsp	0.2 to 10.0 s
Tplat	0 to 50 %
Δ ASB	0 to 35 mbar
Ramp	SLOW, STANDARD, FAST
Pinsp	3 to 55 mbar
O2-Flow	0 to 15 Lpm
NIV	ON,OFF
Tapnoea	0 to 60 s
VTapnoea	50 to 2000 mL
Freq. apnoea	12 to 60 bpm
MV-high	2.0 to 41 Lpm
MV-low	0.5 to 40 Lpm
Freq.-high	10 to 100 bpm
Loudness	1/4 to 4/4
Brightness	1/4 to 4/4

Select hose type

The type of ventilation hose (reusable or disposable hose set) can be configured.
The connectors on the measuring line must also be changed when using a different type of hose set.

```
Select hose type

 Hose type = reusable




*EXIT
```

Set date and time

The date and time can be set.
● Set the current date and time with the positions Year, Month, Day, Hour and Minute.
● Date and time can be reset with »**Set**«.

```
Set date and time (GMT)

 30.10.2001  11:12:41

 Year
 Month
 Day

 Hour
 Minute

 Set

*EXIT
```

Set measured values display window

The arrangement of measured value pairs on the individual pages of the measured values display window can be varied.

Each measured value can be freely selected in any position and is only displayed at that position.

● Start configuration on page 1/5 and continue through to 5/5.

```
Set measured values display
window
---------------------------
|    MV          O2    |  1/5
---------------------------
|    f           VTe   |  2/5
---------------------------
|    PEEP        MEAN  |  3/5
---------------------------
|    PEAK        Pplat |  4/5
---------------------------
|    MVspn       fspn  |  5/5
---------------------------

Set factory default
*EXIT
```

Enter activation code

The activation codes for options can be entered. The activated options are then displayed.

```
Enter activation code

Device-ID: 5354168
Activated: O2 blender
           ASB
           BIPAP
           INHALATION

New code : 0000000000

Set


*EXIT
```

Test buttons and potentiometer

The operating elements on the front panel are displayed schematically on the screen.
Display = screen
B = buttons

Set the controls accordingly for the test:
● »**Vт**« to 500 mL
● »**Freq**.« to 20 1/min
● »**Pmax**« to 40 mbar
● »**O₂**« to 40 %
These settings are displayed on the screen.

To test the buttons:
● Briefly press the corresponding button.
  The associated letter on the screen changes from "B" to "X". If the button has an LED, it will be illuminated by the device. In the case of buttons without LED, the yellow warning lamp lights up on the device.
● Briefly press the »⏻« key. The ventilator switches off if it is pressed for more than 3 seconds.
The function of the rotary knob is not included in the test.

```
Test buttons and potentiometer

Press (B)uttons, adjust potis
==============================
    ##############    B  B   B
            #
B   #   Display   #   B  B  B   B
    #             #
B   ##############  B
                              B B
 VT   Freq.   Pmax     O2
2000   60      30      40
[ml]  [bpm]  [mbar]  [%]        B
==============================
*EXIT
```

Test loudspeaker, buzzer, LEDs and display

Tests the loudspeaker, buzzer, all LEDs and the
display.
Select the required test
● Start the test. Each function is tested by the device.

To test the screen display (Test display):
● Turn the rotary knob; various test cards are
displayed.
The selected test remains active until the rotary knob is
pressed again.

```
Test loudspeaker, buzzer, LEDs
and display

 Test loudspeaker:  !!! WARNING
 Test loudspeaker:  !! CAUTION
 Test loudspeaker:  ! ADVISORY
 Loudness = 3/4

 Test buzzer
 Test LEDs

 Test display
 Brightness min = 1/4
 Brightness max = 3/4

*EXIT
```

Display accu and supply data

The parameters of the replaceable battery and the
status of the external power supply are displayed.
Display (example):

```
Display accu and supply data

Charger        : V00.86
Ext. supply    : ok
Accu state     : charge
Accu type      : MEZ02AF
Accu manufact  : EONE MOLI
Accu serialnr.: 40
Accu chemistry: LION
Accu date      : 24.03.2001
Accu cycle     : 5
Accu designcap : 5400 mAh
Accu fullcap   : 5302 mAh
Accu actualcap:  74 %

*EXIT                Page 1/2
```

Switch over to the second page:
● Select line »**Page**«, confirm and turn rotary knob.
Display (example):

```
Display accu and supply data

Accu voltage  : 12.4 V
Accu current  : 1477 mA
Charg. voltage: 12.6 V
Charg. current: 1500 mA




 EXIT             *Page 2/2
```

Display actual technical error

Momentarily active technical errors are displayed with
the error number and a brief description.
Display (example):

```
Display actual technical error

H  04-0027
POTI: FREQ unplugged
H  04-0026
POTI: VT unplugged
H  04-0028
POTI: PMAX unplugged
H  04-0029
POTI: O2 unplugged



*EXIT
```

80

Display error and info logbook

Any technical errors and/or special occurrences, such as activation of a software option, completion of the device check and device calibration, are listed in chronological order.
Display (example):

Change over to the next page:
● Select line »**Page**«, confirm and turn rotary knob.

```
Display error and info logbook
I  00-0000 31.10.2001 07:35:51
INFO: Device test successfull

I  00-0000 31.10.2001 07:28:36
INFO: Valve V1 calibrated

I  00-0000 31.10.2001 07:27:58
INFO: Valve V2 calibrated

I  00-0000 31.10.2001 07:27:26
INFO: Valve V3 calibrated

*EXIT                Page 001/009
```

Display settings logbook

The operating phases with ventilator settings and time are listed in chronological order.

Change over to the next page:
● Select line »**Page**«, confirm and turn rotary knob.

```
Display settings logbook
Power-ON : 31.10.2001 07:44:09
Mode = IPPV
Trig.= OFF         VT   = 540 ml
PEEP = 5 mbar      Freq.= 20 bpm
I:E  = 1:1.5       O2   = 40 %
Tplat= 0 %         Pmax = 30 mbar


MVspn-Alarms= 0.5 .. 40 lpm
fspn-Alarm  = 100 bpm
Brightness  = 1/4 .. 3/4
Loudness    = 3/4
 EXIT              *Page 003/078
```

Display language text

Alarm messages and advisory messages are displayed by the ventilator in the selected display languages – one text per page.
To change to another page:
● Select line »**Page**«, confirm and turn rotary knob.

To change to another language:
● Select line »**Language 1**« or »**Language 2**«, confirm and turn rotary knob.

```
Display language text

 Language 1: English
 Language 2: Deutsch

 !!! Paw high

 !!! Atemwegsdruck hoch


 EXIT              *Page 004/030
```

Exit service mode

● Press key »⏻« for 3 seconds; its yellow lamp flashes.

To switch ventilation on:
● Briefly press key »⏻«.

To switch off:
● Press rotary knob.

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Technical Data

Technical Data

> **CAUTION!**
> Do not use the device outside the specified
> environmental and supply conditions as the device
> might not operate according to its specifications and
> might even become inoperative.

Ambient conditions

During operation

Temperature	–20 to 50 ^{o}C
Atmospheric pressure	570 to 1200 hPa
Rel. humidity	5 to 95 %

During storage and transportation

Ventilator without replaceable battery, with reusable ventilation hose set

Temperature	–40 to 75 ^{o}C
Atmospheric pressure	570 to 1200 hPa
Rel. humidity	5 to 95 %

Disposable ventilation hose set

Temperature	–20 to 70 ^{o}C
Atmospheric pressure	570 to 1200 hPa
Rel. humidity	30 to 50 %

Replaceable battery

Temperature	–20 to 35 ^{o}C
Atmospheric pressure	570 to 1200 hPa
Rel. humidity	5 to 95 %

Settings

Ventilation modes	IPPV (CMV)/IPPV$_{Assist}$ (CMV$_{Assist}$), SIMV, SIMV/ASB (SIMV/PS), BIPAP (PCV+), BIPAP/ASB (PCV+/PS), CPAP, CPAP/ASB (CPAP/PS)
Ventilation frequency Freq.	2 to 60 1/min ±1 1/min (SIMV, BIPAP) 5 to 60 1/min ±1 1/min (IPPV, IPPV$_{Assist}$) 12 to 60 1/min ±1 1/min for apnoea ventilation
Ventilation time ratio I:E (IPPV, IPPV$_{Assist}$)	1:4 to 3:1
Inspiration time Tinsp (SIMV, SIMV/ASB, BIPAP, BIPAP/ASB)	0.2 to 10 s
Tidal volume V$_T$	0.05 to 2.0 L, BTPS[1]
Accuracy	±15 % of set value or ±25 mL, whichever is greater.
Inspiratory pressure Pinsp	PEEP+3 mbar to 55 mbar[2]
O$_2$ concentration	40 to 100 vol.%
Accuracy	±10 vol.% The setting depends on the inspiratory flow[3] and mean airway pressure
Positive end expiratory pressure PEEP	0 to 20 mbar ±2 mbar, no negative pressure
Trigger sensitivity (flow trigger)	3 to 15 L/min

---

[1] BTPS
Body Temperature, Pressure, Saturated.
Measured values referred to the conditions of the patient's lungs,
body temperature 37 ^{o}C, ambient pressure, water-vapour-saturated gas.
[2] 1 mbar = 100 Pa
[3] see O$_2$ concentration, page 52

Pressure support Δ ASB	0 to 35 mbar (relative to PEEP) ±2 mbar
Rise time for pressure support	slow (1 s), standard (0.4 s), fast (0 s)

Performance data

Control principle	time-cycled, volume-constant, pressure-controlled
Max. inspiratory flow	100 L/min[1]
Device compliance	
with 1.5 m ventilation hose	= < 1 mL/mbar
with 3 m ventilation hose	= < 2 mL/mbar
Inspiration resistance	= < 6 mbar at 60 L/min
	= < 4 mbar at 30 L/min
	= < 2 mbar at 5 L/min
Expiration resistance	= < 6 mbar at 60 L/min
	= < 4 mbar at 30 L/min
	= < 2 mbar at 5 L/min
Dead space incl. flow sensor	approx. 28 mL (reusable hose set)
	approx. 33 mL (disposable hose set)
Supplementary functions	
Demand valve	Opens the breathing system upon failure of the gas supply, permits spontaneous breathing with ambient air
Relief valve	Opens the breathing system at approx. 80 mbar
Patient connection	22 mm ISO conical connector

Measured value display
Airway pressure measurement

Range	0 to 99 mbar
Resolution	1 mbar
Accuracy	±2 mbar
Max. airway pressure	Ppeak
Pos. end expiratory pressure	PEEP
Mean airway pressure	Pmean
Plateau pressure	Pplat

Flow measurement
Minute volume MV

Range	0 to 99 L/min, BTPS
Resolution	0.1 L/min
Accuracy	±15 % of measured value, or ±1 L/min, whichever is greater

Tidal volume V$_{Te}$

Range	0 to 5000 mL, BTPS
Resolution	1 mL
Accuracy	±15 % of measured value, or ±25 mL, whichever is greater

[1] At service pressures >350 kPa.
The maximum inspiratory flow is reduced to 80 L/min at service pressures <350 kPa and to 39 L/min at service pressures <280 kPa.

Frequency measurement

Range	0 to 99 /min
Resolution	1 /min
Accuracy	±1 /min

Curve display

Airway pressure Paw (t)	−10 to 100 mbar
Flow (t)	−120 to 120 L/min

Monitoring
Expiratory minute volume MV

Alarm, upper alarm limit	when the upper alarm limit has been exceeded
Range of settings	2 to 41 L/min
Alarm, lower alarm limit	when the level drops below the lower alarm limit
Range of settings	0.5 to 40 L/min

Airway pressure Paw

Alarm, upper alarm limit	when value "Pmax" is exceeded
Range of settings	20 to 60 mbar
Alarm, lower alarm limit	When pressure difference between inspiratory and expiratory sides is less than 5 mbar or if the set pressure level is not attained.

Apnoea alarm time T_{Apnoea}

Alarm	when respiratory activity is no longer detected
Range of settings	15 to 60 s, can be set in 1 s increments

Operating data
Power supply

Power supply

Input voltage Oxylog 3000	19 V ±0.5 V DC
With DC/DC converter	10 to 32 V DC

Current consumption

With battery charge	max. 3.8 A, typically 2.1 A
Operating time with fully charged internal battery without mains supply for "typical" ventilation	Approx. 4 hours
Operating time with fully charged nickel metal hydride battery, without mains supply for "typical" ventilation	Approx. 3 hours
Battery charge	The device switches over to floating operation when the battery is fully charged.
Battery types	Nickel metal hydride battery Lithium ion battery

Charging times	The specified charging times apply when recharging the battery fully after it has been exhausted.
Nickel Metal Hydrid battery	Approx. 4 hours
Lithium ion battery	Approx. 5 hours
Permissible ambient temperature during charging	0 $^{\circ}$C to 35 $^{\circ}$C
Indication of battery capacity	in 25 % increments
Accuracy of the capacity indication	The indicated capacity is determined by the battery itself. The accuracy depends on the type and manufacturer and may deteriorate with frequent partial discharge and during operation in extreme temperatures. The internal battery is only reconditioned after being discharged completely and recharged at room temperature 25 $^{\circ}$C. The criteria for the warnings »**!!! Int. battery discharged**« and »**!! Charge int. battery**« are therefore based on measurement of the battery voltage. The capacity indicated at this moment may differ from the actual capacity of the internal battery.
Battery storage time	The internal battery must always be removed from Oxylog 3000 for storage and recharged completely after 12 months at the latest (e.g. in the external Oxylog 3000 battery charging station)
AC/DC power pack (2M86730)	
Temperature range	–20 $^{\circ}$C to 50 $^{\circ}$C
Protection class to EN 60601	Class II, the earthing is used for EMC purposes
Input	100 to 240 V~/ 50 to 60 Hz / 1.5 A
Output	19 V ±0.5 V /2.1 A
DC/DC converter	
Temperature range	–20 $^{\circ}$C to 50 $^{\circ}$C
Input	10 to 32 V DC / 9 A
Output	19 V ±0.5 V / 2.1 A, max. 3.8 A
Gas supply	From a pipeline system or from a medical gas cylinder
O_2 service pressure	300 kPa –10 % to 600 kPa at 100 L/min
Supply gas	Medical oxygen or medical air
O_2 inlet connection	either: NIST[1] to EN 739, or DISS[2] to CGA V5-1989, or N-F[3] 590-116/1987. The gas must be dry and free of oil and dust.

1) NIST = Non Interchangeable Screw Thread Connection
2) DISS = Diameter Index Safety Systems
3) N-F = French standard

Gas cylinders and pressure reducers	must comply with national regulations and be officially approved.
Pressure reducer	must have a vent valve on the output side to limit the delivery pressure to approx. 1000 kPa in the event of a fault.
Gas consumption for internal control	0.1 to 0.5 L/min
Accuracy of gas consumption indication	±0.5 L/min

Noise pressure	<45 dB (A) for typical ventilation at a distance of 1 m

Dimensions (W x H x D)

Basic unit	285 x 184 x 175 mm (without handle)
AC/DC power supply	161 x 63 x 118 mm
DC/DC converter	162 x 42 x 69 mm

Weight

Basic unit without internal battery	Approx. 4.9 kg
Basic unit with internal battery	Approx. 5.4 kg
AC/DC power pack	Approx. 0.8 kg
DC/DC converter	Approx. 0.4 kg

Electromagnetic compatibility (EMC)	Tested to EN 60601-1-2:2001, EN 794-3 (36.101) 10 V/m , ISO 10651-3 (36.202.2.1) 30 V/m and UN Regulation nr. 10, revision 2, with respect to EMC for use in motor vehicles, equivalent to Commission Directive 95/54/EC

(E 4) 10 R-02 0296

Classification according to Directive 93/42/EEC Appendix IX	Class IIb

UMDNS-Code Universal Medical Device Nomenclature System	18 – 098

Interface	IrDA Infrared RS 232 interface

Protection class, ventilation hose sets (disposable or reusable)	Type BF 🧍 (body floating)

Type of protection	IPX4

Materials used

Housing, Oxylog 3000	Acrylonitrile styrene acrylate/polycarbonate (ASA/PC)
Housing, AC/DC power pack	Acrylonitrile butadiene styrene/polycarbonate (ASA/PC)
Housing, DC/DC converter	Polycarbonate (PC)
Touch sensitive keypad on ventilator	Polyester film

Reusable ventilation hose set

Ventilation hose, flow measuring hoses	Silicone rubber
Flow sensor housing, breathing valve	Polysulphone (PSU)
Vane in flow sensor	Stainless steel
Diaphragms in breathing valve	Silicone rubber

Disposable ventilation hose set

Ventilation hose	Polyethylene (PE)
Non-return valve	Synthetic resin
Breathing valve	Polyethylene (PE)
Flow sensor housing	Polymethyl methacrylate (PMMA)
Film in flow sensor	Polyester
Adapter	Silicone rubber
Patient connection	Polypropylene (PP)

Display

Technology	Electro-luminescence (EL)
Pixels	240 x 128
Visible area	108 x 56 mm

Technical Documentation for Oxylog 3000 according to EMC standard IEC/EN 60601-1-2: 2001

General Information

The EMC conformity of the Oxylog 3000 includes the use of following external cables, transducers and accessories:

Description	Order-no.
AC/DC power pack 100 - 240 V / 50 - 60 Hz	2M86730
DC/DC Converter	2M86731
All-round Wall holder	5704216
Quick Power Connector	5704217
Carrying system 3000	2M86975

Additionally, accessories may be used which do not affect EMC compliance, if no other reasons interdict the use of them. The non-observance may result in increased emissions or decreased immunity of the Oxylog 3000.

The Oxylog 3000 should not be used adjacent to or stacked with other equipment; if adjacent or stacked use is inevitable, the Oxylog 3000 should be observed to verify normal operation in the configuration in which it will be used.

Electromagnetic Emissions

Electromagnetic Emissions		
The Oxylog 3000 is intended for use in the electromagnetic environment specified below. The user of the Oxylog 3000 should assure that is used in such an environment.		
Emissions	**Compliance according to**	**Electromagnetic environment**
RF emissions (CISPR 11)	Group 1	The Oxylog 3000 uses RF energy only for its internal function. Therefore, its RF emissions are very low and are not likely to cause any interference in nearby electronic equipment.
	Class B	The Oxylog 3000 is suitable for use in all establishments including domestic establishments and those directly connected to the public low-voltage power supply network that supplies buildings used for domestic purposes.
Harmonic emissions (IEC 61000-3-2))	Class A	
Voltage fluctuations / flicker (IEC 61000-3-3)	Complies	

Information re electromagnetic emissions (IEC 60101-1-2: 2001, table 201)

Electromagnetic Immunity

Electromagnetic Immunity			
This Oxylog 3000 is intended for use in the electromagnetic environment specified below. The user of the Oxylog 3000 should assure that is used in such an environment.			
Immunity against	**IEC 60601-1-2 test level**	**Compliance level (of the Oxylog 3000)**	**Electromagnetic environment**
electrostatic discharge, ESD (IEC 61000-4-2)	contact discharge: 6 kV air discharge: 8 kV	8 kV 15 kV	Floors should be wood, concrete or ceramic tile. If floors are covered with synthetic material, the relative humidity should be at least 30%.
electrical fast transients / bursts (IEC 61000-4-4)	power supply lines: 2 kV longer input / output lines: 1 kV	2 kV 1 kV	Mains power quality should be that of a typical commercial or hospital environment.
surges on AC mains lines (IEC 61000-4-5)	common mode: 2 kV differential mode: 1 kV	2 kV 1 kV	Mains power quality should be that of a typical commercial or hospital environment.
power frequency magnetic field 50/60 Hz (IEC 61000-4-8)	3 A/m	3 A/m	In close vicinity to the Oxylog 3000, no equipment with extraordinary power frequency magnetic fields (power transformers, etc.) should be operated.
voltage dips and short interruptions on AC mains input lines (IEC 61000-4-11)	dip >95%, 0.5 periods dip 60%, 5 periods dip 30%, 25 periods dip >95%, 5 seconds	>95%, 0,5 per. 60%, 5 per. 30%, 25 per. >95%, 5 sec.	Mains power should be that of a typical commercial or hospital environment. If user requires continued operation during power mains inter-ruptions, it is recommended to power the Oxylog 3000 from an uninterruptible supply or a battery.
radiated rf (IEC 61000-4-3)	80 MHz - 2.5 GHz: 10 V/m	30 V/m	Recommended separation distance from portable and mobile rf transmitters with transmission power P_{EIRP} to the Oxylog 3000 including its lines: 1.84 m * $\sqrt{P_{EIRP}}$ [X1]
rf coupled into lines (IEC 61000-4-6)	150 kHz - 80 MHz: 10 V within ISM bands, 3 V outside ISM bands [X2]	10 V 3 V	Recommended separation distance from portable and mobile rf transmitters with transmission power P_{EIRP} to the Oxylog 3000 including its lines: 1.84 m * $\sqrt{P_{EIRP}}$ [X1]

Information re electromagnetic immunity (IEC 60601-1-2: 2001, tables 202, 203, 204)

[X1] For P_{EIRP} the highest possible "equivalent isotropic radiated power" of the adjacent rf transmitter has to be inserted (value in Watt). Also in the vicinity of equipment marked with the symbol interference may occur. Field strengths from fixed, portable or mobile rf transmitters at the location of the Oxylog 3000 should be less than 3 V/m in the frequency range from 150 kHz to 2.5 GHz and less than 1 V/m above 2.5 GHz.

[X2] ISM bands in this frequency range are: 6.765 MHz - 6.795 MHz, 13.553 MHz - 13.567 MHz, 26.957 MHz - 27.283 MHz, 40.66 MHz - 40.70 MHz.

Recommended separation distances

Recommended separation distances between portable and mobile RF-Telecommunication devices and the Oxylog 3000			
max. P_{EIRP} (W)	3 V/m distance* (m)	1 V/m distance* (m)	Hint
0.001	0.06	0.17	
0.003	0.10	0.30	
0.010	0.18	0.55	
0.030	0.32	0.95	e.g. WLAN 5250 / 5775 (Europe)
0.100	0.58	1.73	e.g. WLAN 2440 (Europe), Bluetooth
0.200	0.82	2.46	e.g. WLAN 5250 (not in Europe)
0.250	0.91	2.75	e.g. DECT devices
1.000	1.83	5.48	e.g. GSM 1800- / GSM 1900- / UMTS- mobiles, WLAN 5600 (not in Europe)
2.000	2.60	7.78	e.g. GSM 900 mobiles
3.000	3.16	9.49	

Information re separation distances (IEC 60601-1-2: 2001, tables 205 and 206)

* 3 V/m distance to transmitters with frequencies from 150 kHz to 2.5 GHz, otherwise 1 V/m distance.

Description

Description

Ventilation modes

Volume-controlled ventilation

IPPV (CMV)

Volume-constant mandatory ventilation stroke

The ventilation pattern is specified by the settings for tidal volume V_T, frequency Freq., ventilation time ratio I:E and PEEP.

At the end of the flow phase, the expiration valve remains closed until the end of the inspiration time Tinsp. This phase, the inspiratory pause, can be identified as the plateau Pplat in the curve Paw (t).
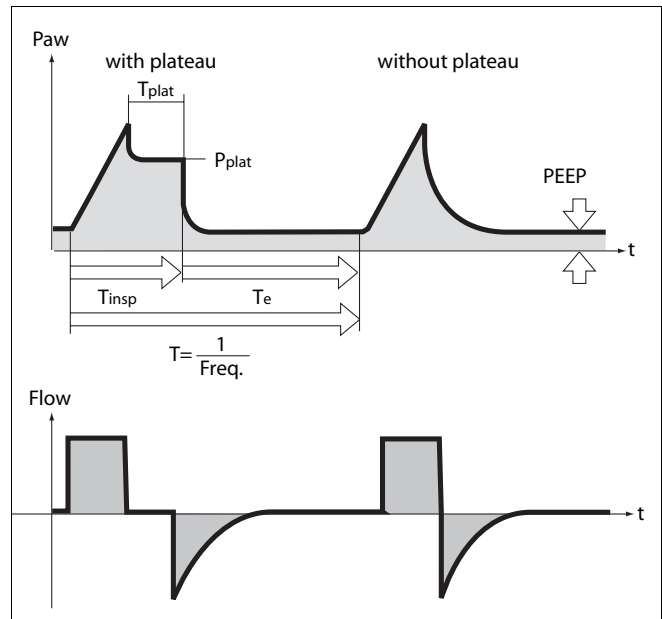
IPPVAssist (CMVAssist)

Assisted ventilation with continuous positive airway pressure.

The mandatory ventilation stroke begins when the patient reaches an inspiratory flow corresponding at least to the flow trigger set.

The current ventilation frequency may be greater than the set frequency for the same trigger.

SIMV

Synchronized **I**ntermittent **M**andatory **V**entilation
Combination of mandatory ventilation and spontaneous breathing

SIMV enables the patient to breathe spontaneously in regular prescribed cycles, with the mechanical mandatory ventilation strokes providing a minimum ventilation during the remaining cycles.

The minimum ventilation is controlled by the two set values tidal volume V_T and frequency Freq. and is determined from the product of V_T x Freq.

The ventilation pattern results from the ventilation parameters tidal volume V_T, frequency Freq. and inspiration time T_{insp}.

To prevent the mandatory ventilation stroke being applied during spontaneous expiration, the Flowtrigger of the ventilator ensures that the ventilation stroke is triggered in synchrony with the patient's spontaneous inspiratory effort within a "trigger window".

The trigger window is 5 seconds long. If the expiration times are less than 5 seconds, the trigger window covers the entire expiration time less a minimum expiration time of 500 ms.

Since the synchronisation of the mandatory ventilation stroke reduces the effective SIMV time, which would result in an undesirable increase in effective frequency, Oxylog 3000 prolongs the subsequent spontaneous breathing time by the missing time difference ΔT – thus preventing an increase in SIMV frequency. The frequency parameter Freq. remains constant. This parameter, in combination with the tidal volume V_T, sets the minimum ventilation.

During the spontaneous breathing phases, the patient can be assisted with pressure by ASB pressure support.

In the course of progressively weaning the patient from artificial ventilation, the ventilation frequency f is further reduced while the spontaneous breathing time is increased, so that the required total minute volume is supplied more and more by spontaneous breathing.
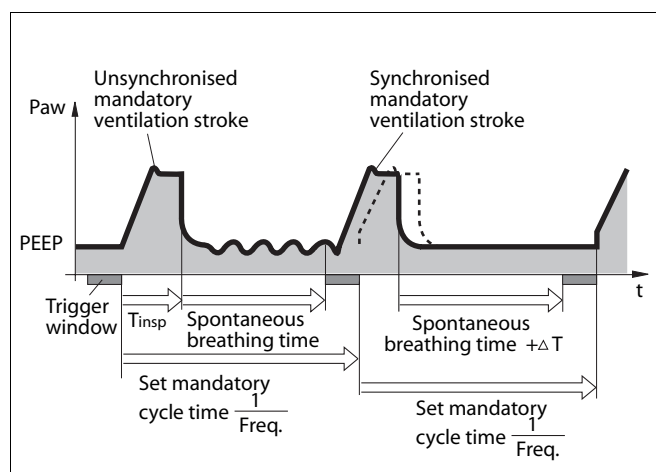
ASB (PS)

Assisted **S**pontaneous **B**reathing (**P**ressure **S**upport)
Pressure support for insufficient spontaneous
breathing.

The function of the machine in assisting insufficient
spontaneous breathing is similar to that of the
anaesthetist who manually assists and monitors the
patient's spontaneous breathing by feeling the
breathing bag.

The machine takes over part of the inhalation function,
with the patient maintaining control of spontaneous
breathing.

The CPAP system supplies the spontaneously
breathing patient with the breathing gas, even if the
inspiration effort is weak.

The pressure support of the ASB system is started:
when the spontaneous inspiration flow reaches the set
value of the Flowtrigger, or at the latest when the
spontaneous inspired volume exceeds 25 mL.

The machine then produces an increase in pressure up
to the preselected ASB pressure ∆ ASB above PEEP,
which is adjustable to the breathing requirement of the
patient.

The time for this pressure increase (»**Ramp**«) is
adjustable:

— In case of rapid increase in pressure Oxylog 3000
   supports the insufficient spontaneous breathing of
   the patient with a high peak flow.

— In case of slow increase in pressure Oxylog 3000
   begins gently with regular inspiratory flow. The
   patient has to take over more breathing effort, and
   tone of breathing muscles improves.

With the patient adjusted pressure increase and the
pressure ∆ P$_{ASB}$ above PEEP, the patient's own
breathing activity defines the required inspiration flow.

ASB is terminated:

— when the inspiration flow returns to zero during
   phase I, i.e. when the patient exhales or fights the
   ventilator or

— when the inspiration flow in phase II falls below 25 %
   of the inspiration flow previously supplied (and thus
   ∆ P$_{ASB}$ above PEEP is reached)
   or

— at the latest after 4 seconds if the two other criteria
   have not come into operation.
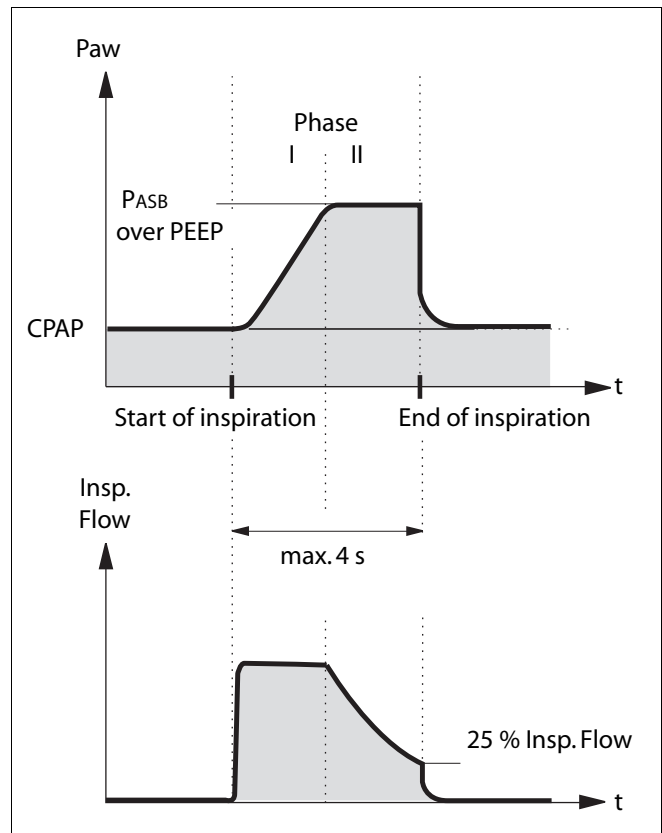
BIPAP (PCV+)

Biphasic **P**ositive **A**irway **P**ressure
(**P**ressure **C**ontrolled **V**entilation plus)

The BIPAP ventilation mode is a pressure-controlled / time-cycled ventilation mode in which the patient can always breathe spontaneously. BIPAP is therefore often described as a time-cycled alternation between two CPAP levels.

The time-cycled change of pressure gives controlled ventilation, which corresponds to pressure-controlled ventilation PCV. However, the constant option of spontaneous breathing allows the transition from controlled ventilation to independent spontaneous breathing to take place smoothly via the weaning phase, without requiring any change of the ventilation mode. To adapt easily to the patient's spontaneous breathing pattern, the changeover from expiratory pressure level to inspiratory pressure level, and also the changeover from inspiratory pressure level to expiratory pressure level, are synchronised with the patient's spontaneous breathing.

The frequency of the changeover is kept constant, even when synchronisation occurs via a trigger window with fixed time constant.

This smooth adaptation to the patient's spontaneous breathing requires less sedation, so that the patient returns to spontaneous breathing more rapidly.

As in all pressure-controlled ventilation modes, the patient is not prescribed a fixed tidal volume V_T. The tidal volume results principally from the pressure difference between the settings for PEEP and Pinsp and also lung compliance.

The display of the expiratory measured tidal volume V_{Te} must be used to set the required difference between the two pressure levels. Any increase in this difference will cause an increased BIPAP ventilation stroke.

Changes in lung compliance and airways, as well as active 'fighting' by the patient can lead to changes in tidal volume. This is a desired effect in this ventilation mode.

With the knowledge that the tidal volume, and therefore the minute volume, are not constant, the alarm limits for minute volume must be adjusted with care.
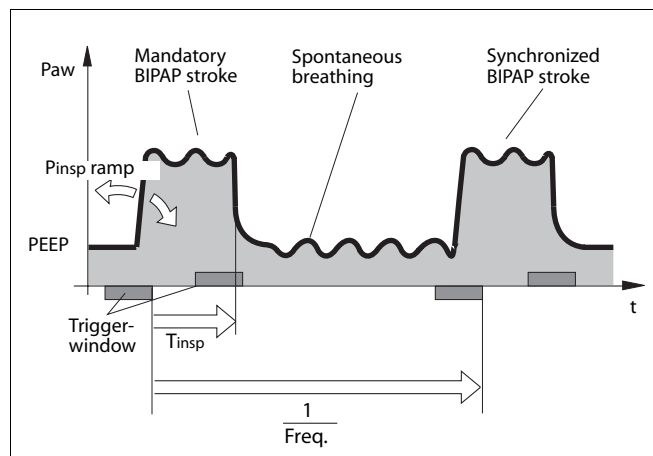
Using BIPAP

As with SIMV, the time pattern is set using the basic setting parameters of frequency Freq. and inspiration time T_{insp}. The lower pressure level is set with the PEEP parameter, while the upper level is set with P_{insp}.

When switching over from IPPV to BIPAP mode, note that the inspiration time T_{insp} is set instead of the ventilation time ratio I:E.

When switching over from SIMV to BIPAP mode – while retaining the time pattern – only the Pinsp setting needs to be changed.

The steepness of the increase from the lower pressure level to the upper pressure level is controlled by the »**Ramp**« setting.

During the lower pressure level phase, spontaneous breathing can be assisted by ASB.

The steepness of the pressure increase to ASB pressure ΔP_{ASB} above PEEP is also controlled by the »**Ramp**« setting.

The transition from controlled ventilation via the weaning phase to fully spontaneous breathing is achieved by a gradual reduction of inspiratory pressure P_{insp} and/or frequency Freq.

98
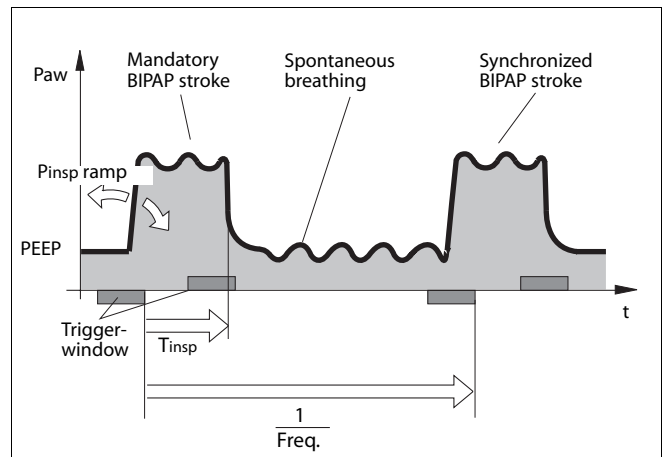
Functional description
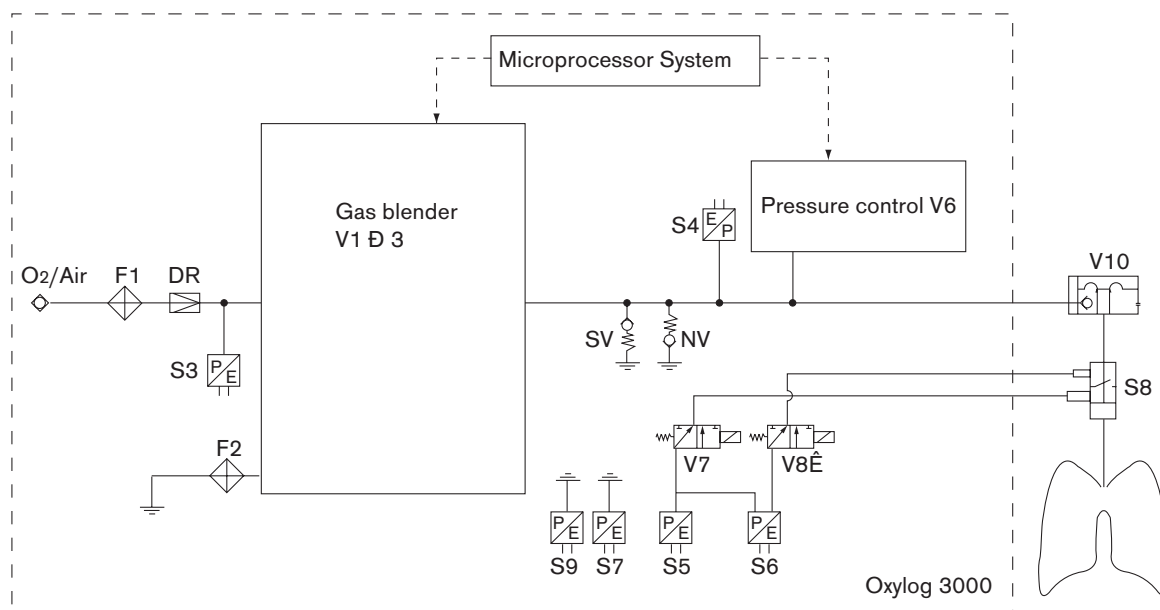
The variable pneumatic actuators in the Oxylog 3000 are controlled by the microprocessor system via digitized electrical test signals.

Gas supply

The supply gas O_2 (or compressed medical air in exceptional cases) is purified by filter F1 and adjusted to a constant pressure by pressure regulator DR. Ambient air is taken in via filter F2 as required. The supply pressure is monitored by pressure sensor S3.

Inspiration

Gas blender V1-3 delivers the variable inspiration flow as a mixture of supply gas O_2 and ambient air in accordance with the ventilation mode and required O_2 concentration. The tidal volume is applied regardless of ambient pressure (absolute pressure sensors S7 and S9) under patient conditions BTPS* for volume-controlled breathing; the applied tidal volume corresponds with that set for BTPS, taking into account the ambient pressure. In this way, Oxylog 3000 meters and measures roughly 10 % less volume in operation with a test lung (dry gas at room temperature).

Expiration

During volume-controlled inspiration, pressure control V6 closes the inspiratory canal and control the PEEP pressure during expiration or reduces the pressure in the inspiration hose to control the ASB, Pinsp or Pmax pressure when the target values are reached. Breathing valve V10 on the patient side, which is

indirectly controlled by V6, seals off against atmospheric air during inspiration and adjusts the required patient pressure during expiration by controlling the pressure in the inspiration hose. The measured value of the airway pressure sensor S5 on the patient side serves as setpoint for pressure regulation.

Safety

In the event of a fault, gas blender V1-3 closes and pressure control V6 opens to the atmosphere. The pneumatic demand valve NV (spontaneous breathing) opens in the presence of a negative pressure. The pneumatic relief valve SV (set to approx. 80 mbar) opens in the presence of an excess pressure.

Monitoring

The flow measured on the patient side by S8 is transmitted to the internal electronic pressure difference sensor S6 as a differential pressure signal. This signal is displayed on the screen as the flow curve. The measured monitoring values tidal volume, minute volume and frequency are derived from the measured expiratory flow. The inspiratory flow signal is used for detection of the flow trigger. System leakages can be identified from the balance of inspiratory and expiratory tidal volumes (e.g. leakage alarm, NIV).

Airway pressure measurement on the patient side supplies the Paw values for the airway pressure curve on the screen via S5, as well as for the derived measured values PEEP, Ppeak, Pplat, Pmean. The plausibility of this airway pressure measurement on the patient side is monitored by a redundant second internal airway pressure measurement in the ventilator via S4 in the inspiratory duct.

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* BTPS
Body Temperature, Pressure, Saturated.
Measured values referred to the patient lung,
body temperature 37 °C, ambient pressure,
water-vapour-saturated gas.

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Order List

Part name	Part No.
Workstation	
Oxylog 3000	2M 86300
Basic unit	
Oxylog 3000	2M 86955
Accessories required for operation	
Power supply:	
AC/DC power pack 100-240 V/50-60 Hz	2M 86 730
Available power cables:	
Germany and Europe	18 24 481
Denmark	18 44 342
United Kingdom	18 44 369
Australia	18 51 705
Switzerland	18 44 377
USA	18 41 793
China	18 59 706
DC/DC converter	2M 86 731
Nickel metal hydride battery or	2M 86 732
Lithium ion battery	2M 86 733
Reusable ventilation hose set, comprising:	
Ventilation hose with measuring leads, 1.5 m	84 12 068
Ventilation hose with measuring leads, 3 m	84 12 913
Breathing valve	84 12 001
Flow sensor	84 12 034
Angled connector	84 12 235
Disposable ventilation hose	57 02 871
Disposable ventilation hose set (set of 5)	57 03 041
Disposable nozzle kit	ME 05 134
Reusable nozzle kit	ME 05 133

Part name	Part No.
Connecting hoses:	
CG*-connecting hoses	
Gas Supply System	57 04 500
Special accessories	
Onboard equipment holder	2M 86 900
Oxylog 3000 battery charging station	2M 86 729
Test lung	84 03 201
Oxylog 3000 Carrying System	2M 86 975
Options	
100 % O_2	ME 05 053
O_2 inhalation	ME 05 052

*   Central piped gas supply

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These Instructions for Use apply only to
Oxylog 3000
with Serial No.:

If no Serial No. has been filled in by
Dräger, these Instructions for Use are
provided for general information only
and are not intended for use with any
specific machine or device.

This document is provided for customer
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CE 0344

Directive 93/42/EEC
concerning Medical Devices

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