Oxylog® 3000

WARNING
For a full understanding of the performance characteristics of this device, the user should carefully read this manual before use of the device.

Emergency and transport ventilator
Instructions for Use
Software 1.n
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 !!!

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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.
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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 understanding 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.

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

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.
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<sub>2</sub> 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) pursuant 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 measures. 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

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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

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

* CMV Controlled Mandatory Ventilation
  PCV+ Pressure Controlled Ventilation plus
  PS Pressure Support
### Restrictions of Use

<table>
<thead>
<tr>
<th>WARNING!</th>
<th>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.</th>
</tr>
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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 O2 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 O2 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.
Reusuable 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

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<th>Explanation</th>
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<tr>
<td>ASB (PS)</td>
<td>Assisted Spontaneous Breathing Pressure-assisted spontaneous breathing</td>
</tr>
<tr>
<td>BIPAP (PCV+)</td>
<td>Biphasic Positive Airway Pressure Spontaneous breathing with continuous positive airway pressure and two different pressure levels</td>
</tr>
<tr>
<td>BIPAP/ASB (PCV+/PS)</td>
<td>Biphasic Positive Airway Pressure Assisted Spontaneous Breathing Pressure-controlled ventilation in combination with spontaneous breathing throughout the breathing cycle and with variable pressure support at CPAP level</td>
</tr>
<tr>
<td>bpm</td>
<td>breaths per minute (in customer mode)</td>
</tr>
<tr>
<td>BTPS</td>
<td>Body Temperature, Pressure Saturated Measured values referred to the conditions of the patient’s lung, body temperature 37 °C, ambient pressure, water-vapour-saturated gas</td>
</tr>
<tr>
<td>C</td>
<td>Compliance</td>
</tr>
<tr>
<td>CMV</td>
<td>Controlled Mandatory Ventilation</td>
</tr>
<tr>
<td>CMVAssist</td>
<td>Controlled Mandatory Ventilation Assisted</td>
</tr>
<tr>
<td>CPAP</td>
<td>Continuous Positive Airway Pressure Spontaneous breathing with continuous positive pressure</td>
</tr>
<tr>
<td>CPAP/ASB (CPAP/PS)</td>
<td>Continuous Positive Airway Pressure Assisted Spontaneous Breathing Spontaneous breathing at an elevated pressure level</td>
</tr>
<tr>
<td>EN 794-3</td>
<td>European standard for medical ventilators, Part 3 &quot;Emergency and transport ventilators&quot;</td>
</tr>
<tr>
<td>Δ ASB (Δ PS)</td>
<td>Set value for pressure support ASB – Δ ASB over PEEP</td>
</tr>
<tr>
<td>f</td>
<td>Ventilation frequency</td>
</tr>
<tr>
<td>fApnoea</td>
<td>Frequency of apnoea ventilation</td>
</tr>
<tr>
<td>FiO2</td>
<td>Inspiratory oxygen concentration</td>
</tr>
<tr>
<td>Freq</td>
<td>Ventilation frequency</td>
</tr>
<tr>
<td>fspn</td>
<td>Spontaneous breathing rate</td>
</tr>
<tr>
<td>IPPV (CMV)</td>
<td>Intermittent Positive Pressure Ventilation</td>
</tr>
<tr>
<td>IPPVAssist</td>
<td>Assisted Intermittent Positive Pressure Ventilation</td>
</tr>
<tr>
<td>i:E</td>
<td>Ratio inspiration time : expiration time</td>
</tr>
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<table>
<thead>
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<th>Explanation</th>
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<tr>
<td>MV</td>
<td>Minute volume</td>
</tr>
<tr>
<td>MVspn</td>
<td>Proportion of the minute volume which is accounted for by spontaneous breathing</td>
</tr>
<tr>
<td>NIV</td>
<td>Non-invasive ventilation – mask ventilation</td>
</tr>
<tr>
<td>O2</td>
<td>Set value for the inspiratory O2 concentration</td>
</tr>
<tr>
<td>O2-Inhalat.</td>
<td>O2 inhalation</td>
</tr>
<tr>
<td>Paw</td>
<td>Airway pressure</td>
</tr>
<tr>
<td>PCV+</td>
<td>Pressure Controlled Ventilation plus</td>
</tr>
<tr>
<td>PEEP</td>
<td>Positive end expiratory pressure</td>
</tr>
<tr>
<td>Pmax</td>
<td>Maximum airway pressure</td>
</tr>
<tr>
<td>Pmean</td>
<td>Mean airway pressure</td>
</tr>
<tr>
<td>Ppeak</td>
<td>Maximum airway pressure</td>
</tr>
<tr>
<td>Pplat</td>
<td>End inspiratory airway pressure</td>
</tr>
<tr>
<td>PS</td>
<td>Pressure Support, pressure assisted spontaneous breathing</td>
</tr>
<tr>
<td>R</td>
<td>Resistance</td>
</tr>
<tr>
<td>Ramp</td>
<td>Set value for the rise in pressure over time for pressure assistance with ASB</td>
</tr>
<tr>
<td>SIMV</td>
<td>Synchronized Intermittent Mandatory Ventilation</td>
</tr>
<tr>
<td>SIMV/ASB (SIMV/PS)</td>
<td>Synchronized Intermittent Mandatory Ventilation / Assisted Spontaneous Breathing - Ventilation can be supplemented with ASB</td>
</tr>
<tr>
<td>TAapnoea</td>
<td>Apnoea alarm time</td>
</tr>
<tr>
<td>Te</td>
<td>Expiration time</td>
</tr>
<tr>
<td>Tinsp</td>
<td>Set inspiration time</td>
</tr>
<tr>
<td>Tplat</td>
<td>Plateau time</td>
</tr>
<tr>
<td>VTApnoea</td>
<td>Tidal volume of apnoea ventilation</td>
</tr>
<tr>
<td>Vr</td>
<td>Set tidal volume</td>
</tr>
<tr>
<td>VTe</td>
<td>Exp. Tidal volume</td>
</tr>
<tr>
<td>VTi</td>
<td>Insp. Tidal volume</td>
</tr>
<tr>
<td>100 % O2</td>
<td>100 % O2 flow</td>
</tr>
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Symbols

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<th>Explanation</th>
<th>Symbol</th>
<th>Explanation</th>
</tr>
</thead>
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<tr>
<td>Inspiration is started and held manually</td>
<td></td>
<td>Do not dispose of the device as municipal waste, but dispose of at municipal collection points for waste electrical and electronic equipment.</td>
<td></td>
</tr>
<tr>
<td>Display screen window &quot;Settings&quot;</td>
<td></td>
<td>Manufacturing date</td>
<td></td>
</tr>
<tr>
<td>Display screen window &quot;Alarms&quot;</td>
<td></td>
<td>Manufacturer</td>
<td></td>
</tr>
<tr>
<td>Display screen window &quot;Measured values&quot;</td>
<td></td>
<td>DC input</td>
<td></td>
</tr>
<tr>
<td>Changeover between flow/pressure curve</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Suppress acoustic alarm for 2 minutes</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acknowledge alarms</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Standby/Operation switch</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lower and upper alarm limits</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Upper alarm limit only</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lower alarm limit only</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Advisory message</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Caution message</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Warning</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Strictly follow the Instructions for Use!</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Type BF applied part (body floating)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Battery status: charging (orange) or full (green)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>External power supply connected</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Battery charge (example: half full)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The device complies with UN Regulation nr. 10, revision 2 with respect to EMC for use in motor vehicles.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Device protected from water sprayed from all directions, limited entrance allowed.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Class II equipment, device protected against electric shock with additional safety precautions such as double or reinforced insulations, without protective earthing.</td>
<td></td>
<td></td>
<td></td>
</tr>
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Operating concept

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Operating concept

Key for switching on/off
1 To switch on, briefly press the »Ô« key.

1 To switch off, hold down the »Ô« 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 $\text{Freq.} \ [1/\text{min}]$,  
  – Max. inspiratory pressure $P_{\text{max}}$ [mbar],
  – $O_2$ concentration $O_2$ [%].

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. $T_{\text{insp}}$, PEEP, $\Delta$ ASB, $P_{\text{insp}}$).
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
2 press the appropriate key briefly and
3 confirm. The selected ventilation mode will now be activated.
4 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 » Ø « 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: 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 » fApnoea «,
- Tidal volume for apnoea ventilation » VTApnoea «
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 VT 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:

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.
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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.
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.

---

**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.
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 »N« lights up regardless of whether the ventilator is switched on or off. The battery is being charged.
2. The three-coloured indicator »J« 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 »N« and »J« 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 O₂:

**WARNING!**
Secure O₂ cylinders so they cannot fall over and keep away from excessive heat. Risk of explosion!

**WARNING!**
Do not grease or lubricate O₂ 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. O₂ makes all fires burn more fiercely!

**CAUTION!**
Always provide adequate ventilation in order to maintain ambient O₂ concentration < 24%.

Oxylog 3000 can be supplied with either O₂ 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 O₂ cylinder

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

- Use a full O₂ cylinder.
- Screw pressure reducer (270 to 600 kPa delivery pressure, 500 kPa nominal pressure) to O₂ 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 O₂ medical gas hose into Oxylog 3000.
2. Connect O₂ 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 O₂ 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 O₂ 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, Vₜ = 1 L, O₂ = 100 %
Minute volume = 10 1/min x 1 L = 10 L/min

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

Operation time = \( \frac{500}{10.5} \) = approx. 48 minutes

The pneumatic operation time increases when Oxylog 3000 operates with an O₂ concentration of less than 100 % O₂, 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:
O₂ consumption = 2.5 L/min

---

* Gas consumption of ventilator: max. 0.5 L/min
Supply from a piped medical gas system
1 Screw O₂ medical gas hose into Oxylog 3000 and
2 plug gas probe into O₂ terminal unit until it has
  engaged twice and the supply of O₂ 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.
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 a catheter 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 V̇e indicated on display may differ from the MV and V̇e 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 »O« 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.
Preparation

- Select »Device check« in main menu and confirm. The device check can be ended at any time by pressing the »Alarm Reset« key.

- Ensure that the gas supply has been connected.

- Ensure that the correct gas type (O₂ 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.
Ensure that the test lung has been connected.

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.

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.

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.

- 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.

The result is displayed by Oxylog 3000:

- 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.

- 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

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<th>Cause</th>
<th>Remedy</th>
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<td>No communication control-/charge-board</td>
<td>Device defective.</td>
<td>Call DrägerService.</td>
</tr>
<tr>
<td>System leakage</td>
<td>Leak in ventilation hose and/or test lung.</td>
<td>Check hoses, breathing valve, flow sensor and test lung for leaks and replace if necessary.</td>
</tr>
<tr>
<td></td>
<td>Internal leak in system.</td>
<td>Call DrägerService.</td>
</tr>
<tr>
<td>No testlung</td>
<td>Test lung not connected or major leakage.</td>
<td>Connect test lung. Check hoses, breathing valve, flow sensor and test lung for leaks and replace if necessary.</td>
</tr>
<tr>
<td>Breathing valve inop</td>
<td>Breathing valve has malfunctioned.</td>
<td>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.</td>
</tr>
<tr>
<td>Pressure measurement inop</td>
<td>The ventilation hose set has not been connected correctly.</td>
<td>Connect ventilation hose set correctly.</td>
</tr>
<tr>
<td></td>
<td>Pressure measurement is implausible.</td>
<td>Call DrägerService.</td>
</tr>
<tr>
<td>PEEP valve inop</td>
<td>Internal leak in system.</td>
<td>Check hoses, breathing valve, flow sensor and test lung for leaks and replace if necessary.</td>
</tr>
<tr>
<td></td>
<td>Device defective.</td>
<td>Call DrägerService.</td>
</tr>
<tr>
<td>Flow measurement inop</td>
<td>Flow measurement implausible.</td>
<td>Replace flow sensor. Call DrägerService.</td>
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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 »O« 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 – Intermittent Positive Pressure Ventilation
Volume-controlled ventilation with fixed mandatory minute volume MV, set with tidal volume VT and frequency Freq.

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

IPPVAssist – Intermittent Positive Pressure Ventilation Assisted
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 »VT«
— 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 VT 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.

Setting alarm limits, page 53.
SIMV, SIMV/ASB (SIMV/PS)

Synchronised Intermittent Mandatory Ventilation Assisted Spontaneous Breathing

Fixed mandatory minute volume MV set with tidal volume VT 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 »VT«
- 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 VT 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 Positive Airway Pressure Assisted Spontaneous Breathing**

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 Positive Airway Pressure Assisted Spontaneous Breathing

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«
— O₂ 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 »fApnoea«, tidal volume »VTApnoea« and the maximum airway pressure »Pmax« upon expiry of the set alarm time "TApnoea". 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 »fApnoea« remains constant.

Setting apnoea ventilation
On the screen:
1  Press »Settings « key until screen page 2/3 appears.

To switch apnoea ventilation on:
- Set »TApnoea« to a value between 15 and 60 seconds.

The parameters fApnoea and VTApnoea, which are required for setting apnoea ventilation, are now displayed:
- Set »fApnoea« and »VTApnoea«.

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 »TApnoea« 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 $f_{\text{Apnoea}} = 12 \text{ 1/min}$ and $V_{\text{TApnoea}} = 500 \text{ mL}$ 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.
**O₂ concentration with "O₂ blending" (40 % to 100 %)**

The O₂ concentration can be varied between 40 % and 100 %, regardless of the ventilation mode. When supplied with 100 % oxygen, lower inspiratory O₂ 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 O₂ concentration which can be realized, is dependent on the mean airway pressure and the inspiratory flow.

The mean O₂ concentration realized is displayed in the measured values window as a calculated value, based on the measured air intake and total flow.

The O₂ concentration is a calculated value and not based on one which has been measured by an O₂ sensor for the inspiratory O₂ concentration FiO₂!

If Oxylog 3000 cannot achieve the set O₂ concentrations, it will signal "! Check settings O₂" and prompt the user to correct the setting.

Then

- Correct setting via control "O₂".

When the O₂ concentration has been set, the measured value will be displayed after approx. 30 seconds. The message "! Check settings O₂" is displayed with a delay after setting the value.

When patients are breathing spontaneously, the achievable O₂ concentration will depend on the profile of the inspiratory flow. Even if this profile is changed, the message "! Check settings O₂" may appear after some time if the desired concentration can not be reached..

**WARNING!**

In toxic surroundings:

- The patient must be ventilated with 100 % O₂ 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.
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

\[\begin{align*}
\text{\(\_\_\_\_\text{lower alarm limit}\)} & = \text{lower alarm limit} \\
\text{\(\_\_\_\_\text{upper alarm limit}\)} & = \text{upper alarm limit}
\end{align*}\]

<table>
<thead>
<tr>
<th>Alarm</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>MV</td>
<td>2 to 41 L/min</td>
</tr>
<tr>
<td>MV</td>
<td>0.5 to 40 L/min</td>
</tr>
<tr>
<td>fspn</td>
<td>10 to 100 1/min</td>
</tr>
</tbody>
</table>

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:

\[\begin{align*}
\text{MV\_\_\_\_} & : \text{Measured value MV +2 L/min} \\
\text{MV\_\_\_\_} & : \text{Measured value MV –2 L/min} \\
\text{fspn\_\_\_\_} & : \text{Measured value Frequency +5 1/min}
\end{align*}\]

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 » Ø « 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 » Ø « 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 >> « 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, Vₜₑ
3. PEEP, Pmean
4. Ppeak, Pplat
5. MVₛₚₚn, fₛₚₚn

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 »VT« 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 \( \swarrow \)« is active in both mains and battery operation when making settings on the ventilator.
— The setting »Brightness \( \searrow \)« is active when operating with replaceable battery.

Shutdown
After disconnecting the patient:
Switch ventilator off:
1  Press key »O« 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 (O2 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 »O« 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 «.
- Select and activate line »Language«.
- Select language and confirm.
The new language selected is immediately effective.

Set gas supply
- Press key »Settings « to select the menu »Configuration and information «.
- Select and activate line »Gas supply«.
- 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.

Display battery type
- Press key »Settings « to select the menu »Configuration and information «.
The performance data of the inserted battery are displayed on the device.
Fault – cause – remedy

Messages in the Alarms window ........................................ 64
Messages in the information window ................................. 66
Fault – cause – remedy

Oxylog 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

<table>
<thead>
<tr>
<th>Message</th>
<th>Cause</th>
<th>Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>! 21% oxygen</td>
<td>The device has been set to medical air and may only be operated with medical air.</td>
<td>Ventilate in IPPV (CMV) mode. Ensure that hose connections are tight.</td>
</tr>
<tr>
<td>!!! Apnoea</td>
<td>Spontaneous breathing by the patient has failed, or disconnection.</td>
<td>Check ventilation mode. Return to original ventilation mode: Press the »Alarm Reset« key.</td>
</tr>
<tr>
<td></td>
<td>F aulty flow sensor.</td>
<td>Replace flow sensor.</td>
</tr>
<tr>
<td>!!! Apnoea ventilation</td>
<td>The ventilator has automatically switched over to mandatory ventilation after detecting an apnoea (only in CPAP mode).</td>
<td></td>
</tr>
<tr>
<td>(only for CPAP)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>!! Charge int. battery</td>
<td>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).</td>
<td>The ventilator must immediately be reconnected to the mains supply, an onboard DC supply or a fully charged battery.</td>
</tr>
<tr>
<td>!! Check settings flow</td>
<td>The flow resulting from the settings for &quot;Tidal volume ( V_T ) per unit time&quot; is impossible.</td>
<td>Change tidal volume ( V_T ) or inspiratory time ( T_{insp} ) or ventilation time ratio ( I:E ).</td>
</tr>
<tr>
<td>(only for optional &quot;O2 blending&quot;)</td>
<td>The set O2 concentration cannot be achieved with the set flow.</td>
<td>Adjust inspiratory flow or O2 concentration (in accordance with measured value).</td>
</tr>
<tr>
<td>!! Check settings time</td>
<td>The expiration time resulting from the settings for ( F_{req} ), and ( I:E ) or ( T_{insp} ) is impossible.</td>
<td>Change ( F_{req} ), or ( I:E ) or ( T_{insp} ).</td>
</tr>
<tr>
<td>!!! Confirm device OFF with rotary knob</td>
<td>Key » O « has been pressed for 3 seconds.</td>
<td>To switch off: confirm. To continue ventilation, press key » O « again.</td>
</tr>
<tr>
<td>!! Flow measurement inop</td>
<td>Measurement hoses for flow measurement on patient side buckled, disconnected or leaking.</td>
<td>Ensure measurement hoses for flow measurement on patient side are connected correctly.</td>
</tr>
<tr>
<td></td>
<td>Flow sensor defective.</td>
<td>Replace flow sensor.</td>
</tr>
<tr>
<td></td>
<td>Technical defect.</td>
<td>Call DrägerService – only restricted operation is now possible.</td>
</tr>
<tr>
<td>!! Gas delivery failure</td>
<td>Technical defect.</td>
<td>Call DrägerService – only restricted operation is now possible.</td>
</tr>
<tr>
<td>Message</td>
<td>Cause</td>
<td>Remedy</td>
</tr>
<tr>
<td>-------------------------</td>
<td>----------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------</td>
</tr>
<tr>
<td>!! High frequency</td>
<td>Patient breathes at a high spontaneous rate.</td>
<td>Check patient's condition, check ventilation pattern, correct alarm limit fspn if necessary.</td>
</tr>
<tr>
<td>!! Int. battery charging inop</td>
<td>Technical defect.</td>
<td>Call DrägerService – only restricted operation is now possible.</td>
</tr>
<tr>
<td>!!! Int. battery discharged</td>
<td>The operating time for operation with the internal battery has expired and an external DC supply has not been connected.</td>
<td>The ventilator must immediately be reconnected to a mains supply, an on-board DC supply or a fully charged battery.</td>
</tr>
<tr>
<td>!! Int. battery in use</td>
<td>Oxylog 3000 draws its power from the internal battery due to the absence of an external DC supply.</td>
<td>Press »Alarm Reset« key to confirm alarm.</td>
</tr>
<tr>
<td>!! Key failed</td>
<td>Technical defect.</td>
<td>Call DrägerService – only limited operation is now possible.</td>
</tr>
<tr>
<td>!!! Leakage (not in NIV)</td>
<td>The measured expiratory tidal volume VT is approx. 40 % lower than the inspiratory value.</td>
<td>Repair leaks in patient system and possibly in tube. Use new flow measuring hoses.</td>
</tr>
<tr>
<td></td>
<td>Faulty flow sensor.</td>
<td>Replace flow sensor.</td>
</tr>
<tr>
<td></td>
<td>The ventilator may not function properly.</td>
<td>Call DrägerService.</td>
</tr>
<tr>
<td>!! Loss of data</td>
<td>Technical defect.</td>
<td>Call DrägerService – only restricted operation is now possible.</td>
</tr>
<tr>
<td>!! Loudspeaker inop</td>
<td>Technical defect.</td>
<td>Call DrägerService – only restricted operation is now possible.</td>
</tr>
<tr>
<td>!!! MV high</td>
<td>The upper alarm limit for the minute volume MV has been exceeded.</td>
<td>Check patient's condition, check ventilation pattern, adjust alarm limits if necessary.</td>
</tr>
<tr>
<td></td>
<td>Faulty flow sensor.</td>
<td>Replace flow sensor.</td>
</tr>
<tr>
<td></td>
<td>The ventilator may not function properly.</td>
<td>Call DrägerService.</td>
</tr>
<tr>
<td>!!! MV low</td>
<td>The minute volume MV has dropped below its lower alarm limit.</td>
<td>Check patient's condition, check ventilation pattern, adjust alarm limits if necessary.</td>
</tr>
<tr>
<td></td>
<td>Leak in breathing system.</td>
<td>Ensure connections in breathing system are tight.</td>
</tr>
<tr>
<td></td>
<td>Faulty flow sensor.</td>
<td>Replace flow sensor.</td>
</tr>
<tr>
<td></td>
<td>The ventilator may not function properly.</td>
<td>Call DrägerService.</td>
</tr>
<tr>
<td>!! No int. battery ?</td>
<td>Internal battery not fitted, faulty or wrong battery fitted.</td>
<td>Fit battery or confirm alarm or change internal battery.</td>
</tr>
<tr>
<td>! No int. battery ?</td>
<td>Internal battery not fitted, faulty or wrong battery fitted.</td>
<td>Advisory message, is displayed continuously when confirmed, change internal battery.</td>
</tr>
<tr>
<td>! No int. battery charging</td>
<td>Internal battery cannot be charged.</td>
<td>Press »Alarm Reset« key to confirm alarm.</td>
</tr>
</tbody>
</table>
### Fault – cause – remedy

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

### Messages in the information window

**(Numerical examples)**

<table>
<thead>
<tr>
<th>Message</th>
<th>Cause</th>
<th>Explanation/Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>( f = 12 \text{ per min} \text{ or } V_T = 800 \text{ mL} )</td>
<td>Change in Tinsp, ( f ) or ( V_T ) in ventilation mode SIMV.</td>
<td></td>
</tr>
<tr>
<td>( I : E = 1 : 1.5 ) Flow = 15 L/min</td>
<td>Change in ( I/E, f ) or ( V_T ) in ventilation mode IPPV (CMV), IPPVAassist (CMVAssist)</td>
<td></td>
</tr>
<tr>
<td>( f = 12 \text{ per min} \text{ or } V_T = 800 \text{ mL} )</td>
<td>Change in ( I/E, f ) or ( V_T ) in ventilation mode IPPV (CMV), IPPVAassist (CMVAssist)</td>
<td></td>
</tr>
<tr>
<td>Tinsp = 0.7 s Flow = 35 L/min</td>
<td>Change in Tinsp or ( f ) in ventilation mode BIPAP (PCV+).</td>
<td></td>
</tr>
<tr>
<td>I : E = 1 : 1.5 Texp = 2 s</td>
<td>The required setting of PEEP &gt;10 mbar is only possible when confirmed via the central rotary knob.</td>
<td></td>
</tr>
<tr>
<td>( \text{PEEP} &gt; 10 \text{ mbar?} )</td>
<td>PEEP &gt;10 mbar has been set but not confirmed.</td>
<td></td>
</tr>
<tr>
<td>Gas consumption = 10 L/min</td>
<td>Standard display in information window for the current gas consumption.</td>
<td></td>
</tr>
<tr>
<td>( \text{Battery capacity} )</td>
<td>Standard display in information window for the current battery capacity.</td>
<td></td>
</tr>
<tr>
<td>( \text{Pinsp} \geq \text{PEEP} + 3 \text{ mbar !} )</td>
<td>Set PEEP+ 3 mbar &gt;Pinsp.</td>
<td>Set Pinsp &gt; PEEP+ 3 mbar.</td>
</tr>
<tr>
<td>( \Delta \text{PASB} = 22 \text{ mbar} )</td>
<td>Change in ( \Delta ) ASB or PEEP.</td>
<td>( \Delta ) PASB is the absolute pressure resulting from PEEP + ( \Delta ) ASB.</td>
</tr>
</tbody>
</table>
Cleaning

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Device disposal ..................................................... 73
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.
Cleaning

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 oxide (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
- Trichloroi

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 °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

- 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.
Service Mode

Customer Service Mode ........................................ 76
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Exit service mode ............................................... 81
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.

Ventilation is not possible in service mode.

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
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

To enter service mode
1,2 Turn controls »VT« and »Freq.« to right-hand stop.
3 Switch on the device = briefly press key »O« 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.

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

Switch over to the second page:
- Select line »Page«, confirm and turn rotary knob.
Display (example):
To restore the manufacturer's defaults:

- Select and confirm line »Set factory default«.

Range of settings:

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

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.

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 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.

Enter activation code

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

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:
- »Vr« 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 »O « 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.
Service Mode

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.

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

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

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

Exit service mode

- Press key »Ö« for 3 seconds; its yellow lamp flashes.

To switch ventilation on:
- Briefly press key »Ö«.

To switch off:
- Press rotary knob.
Technical Data

Technical Data

Technical Documentation for Oxylog 3000 according to EMC standard IEC/EN 60601-1-2: 2001
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 °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 °C
  - **Atmospheric pressure**: 570 to 1200 hPa
  - **Rel. humidity**: 5 to 95 %

- **Disposable ventilation hose set**
  - **Temperature**: –20 to 70 °C
  - **Atmospheric pressure**: 570 to 1200 hPa
  - **Rel. humidity**: 30 to 50 %

- **Replaceable battery**
  - **Temperature**: –20 to 35 °C
  - **Atmospheric pressure**: 570 to 1200 hPa
  - **Rel. humidity**: 5 to 95 %

**Settings**

- **Ventilation modes**
  - IPPV (CMV), IPPVAssist (CMVAssist), 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, IPPVAssist)
  - 12 to 60 1/min ±1 1/min for apnoea ventilation

- **Ventilation time ratio I:E** (IPPV, IPPVAssist)
  - 1:4 to 3:1

- **Inspiration time Tinsp (SIMV, SIMV/ASB, BIPAP, BIPAP/ASB)**
  - 0.2 to 10 s

- **Tidal volume VT**
  - 0.05 to 2.0 L, BTPS\(^1\)
  - ±15 % of set value or ±25 mL, whichever is greater.

- **Inspiratory pressure Pinsp PEEP+3 mbar to 55 mbar\(^2\)**

- **O₂ concentration**
  - 40 to 100 vol.%
  - ±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 °C, ambient pressure, water-vapour-saturated gas.

\(^2\) 1 mbar = 100 Pa

\(^3\) see O₂ concentration, page 52
Pressure support Δ ASB
Rise time for pressure support
0 to 35 mbar (relative to PEEP) ±2 mbar
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
- = < 2 mL/mbar
- with 3 m ventilation hose
- = < 6 mbar at 60 L/min
- = < 4 mbar at 30 L/min
- = < 2 mbar at 5 L/min

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
  - P_{peak}
- Pos. end expiratory pressure
  - P_{EEP}
- Mean airway pressure
  - P_{mean}
- Plateau pressure
  - P_{plat}

**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.
Technical Data

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 TApnoea
- 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
- 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

Nickel Metal Hydrid battery
Approx. 4 hours
Lithium ion battery
Approx. 5 hours

Permissible ambient temperature during charging
0 °C to 35 °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 °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 °C to 50 °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 °C to 50 °C
Input
10 to 32 V DC / 9 A
Output
19 V ±0.5 V / 2.1 A, max. 3.8 A

Gas supply

O2 service pressure
300 kPa –10 % to 600 kPa at 100 L/min
Supply gas
Medical oxygen or medical air
O2 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
Technical Data

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

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

UMDNS-Code 18 – 098

Universal Medical Device Nomenclature System

Interface IrDA Infrared RS 232 interface

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

Type of protection IPX4
Technical Data

Materials used

<table>
<thead>
<tr>
<th>Item</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>Housing, Oxylog 3000</td>
<td>Acrylonitrile styrene acrylate/polycarbonate (ASA/PC)</td>
</tr>
<tr>
<td>Housing, AC/DC power pack</td>
<td>Acrylonitrile butadiene styrene/polycarbonate (ASA/PC)</td>
</tr>
<tr>
<td>Housing, DC/DC converter</td>
<td>Polycarbonate (PC)</td>
</tr>
<tr>
<td>Touch sensitive keypad on ventilator</td>
<td>Polyester film</td>
</tr>
<tr>
<td>Reusable ventilation hose set</td>
<td></td>
</tr>
<tr>
<td>Ventilation hose, flow measuring hoses</td>
<td>Silicone rubber</td>
</tr>
<tr>
<td>Flow sensor housing, breathing valve</td>
<td>Polysulphone (PSU)</td>
</tr>
<tr>
<td>Vane in flow sensor</td>
<td>Stainless steel</td>
</tr>
<tr>
<td>Diaphragms in breathing valve</td>
<td>Silicone rubber</td>
</tr>
<tr>
<td>Disposable ventilation hose set</td>
<td></td>
</tr>
<tr>
<td>Ventilation hose</td>
<td>Polyethylene (PE)</td>
</tr>
<tr>
<td>Non-return valve</td>
<td>Synthetic resin</td>
</tr>
<tr>
<td>Breathing valve</td>
<td>Polyethylene (PE)</td>
</tr>
<tr>
<td>Flow sensor housing</td>
<td>Polymethyl methacrylate (PMMA)</td>
</tr>
<tr>
<td>Film in flow sensor</td>
<td>Polyester</td>
</tr>
<tr>
<td>Adapter</td>
<td>Silicone rubber</td>
</tr>
<tr>
<td>Patient connection</td>
<td>Polypropylene (PP)</td>
</tr>
<tr>
<td>Display</td>
<td></td>
</tr>
<tr>
<td>Technology</td>
<td>Electro-luminescence (EL)</td>
</tr>
<tr>
<td>Pixels</td>
<td>240 x 128</td>
</tr>
<tr>
<td>Visible area</td>
<td>108 x 56 mm</td>
</tr>
</tbody>
</table>
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:

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

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

<table>
<thead>
<tr>
<th>Electromagnetic Emissions</th>
<th>Compliance according to</th>
<th>Electromagnetic environment</th>
</tr>
</thead>
<tbody>
<tr>
<td>RF emissions (CISPR 11)</td>
<td>Group 1</td>
<td>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.</td>
</tr>
<tr>
<td>Harmonic emissions (IEC 61000-3-2))</td>
<td>Class A</td>
<td>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.</td>
</tr>
<tr>
<td>Voltage fluctuations / flicker (IEC 61000-3-3)</td>
<td>Complies</td>
<td></td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Immunity against</th>
<th>IEC 60601-1-2 test level</th>
<th>Compliance level (of the Oxylog 3000)</th>
<th>Electromagnetic environment</th>
</tr>
</thead>
</table>
| 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 interruptions, 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: $1.84 \, m \times \sqrt{P_{EIRP}}$ (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: $1.84 \, m \times \sqrt{P_{EIRP}}$ (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

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<th>max. $P_{EIRP}$ (W)</th>
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<th>1 V/m distance$^*$ (m)</th>
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<tr>
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<td>0.18</td>
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<tr>
<td>0.030</td>
<td>0.32</td>
<td>0.95</td>
<td>e.g. WLAN 5250 / 5775 (Europe)</td>
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<td>0.100</td>
<td>0.58</td>
<td>1.73</td>
<td>e.g. WLAN 2440 (Europe), Bluetooth</td>
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<td>0.200</td>
<td>0.82</td>
<td>2.46</td>
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<td>0.91</td>
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<tr>
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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.
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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 $T_{insp}$. This phase, the inspiratory pause, can be identified as the plateau $P_{plat}$ 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 Intermittent Mandatory Ventilation
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 VT and frequency Freq. and is determined from the product of VT x Freq.

The ventilation pattern results from the ventilation parameters tidal volume VT, 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 VT, 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 Spontaneous Breathing (Pressure Support)
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 $\Delta$ 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 $\Delta$ Pasb 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 $\Delta$ Pasb above PEEP is reached) or
— at the latest after 4 seconds if the two other criteria have not come into operation.
**BIPAP (PCV+)**

**Biphasic Positive Airway Pressure**  
(Pressure Controlled Ventilation 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 VT. 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 VTe 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\text{insp}. The lower pressure level is set with the PEEP parameter, while the upper level is set with P\text{insp}.
When switching over from IPPV to BIPAP mode, note that the inspiration time T\text{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 P\text{insp} setting needs to be changed.
The steepness of the increase from the lower pressure level to the upper pressure level is controlled by the \textit{»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 \textit{»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.
Gas supply
The supply gas O₂ (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 O₂ and ambient air in accordance with the ventilation mode and required O₂ 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.

* 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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<tr>
<td>Oxylog 3000</td>
<td>2M 86955</td>
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### 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 **Lithium ion battery** 2M 86 732

**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

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**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 % O₂ ME 05 053
- O₂ inhalation ME 05 052

*Central piped gas supply*
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Oxylog 3000
with Serial No.:

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0344

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Dräger Medical b.v.
☞ Kanaaldijk 29
5683 CR BEST
The Netherlands
☎ +31 499 331 331
FAX +31 499 331 335
✉ medical.best@draeger.com
営 www.draeger-medical.com

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