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AI16000A USER MANUAL

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制 订	苏振高	审 核	邵晓军	批 准	李修往
日 期	2018.1.18	日 期	2018.1.18	日 期	2018.1.18



D-Tiger

All6000A USER MANUAL

Instructions and Safety Considerations of Ambulanc Emergency Ventilator



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- the product is used in accordance with the instructions for use.



Warning

- This equipment must be operated by skilled/trained clinical professionals.
- It is important for the hospital or organization that employs this equipment to carry out a reasonable service/maintenance plan. Neglect of this may result in machine breakdown or personal injury.

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- Malfunction or damage caused by improper operation or repair by unqualified or unauthorized service people.
- Malfunction of the instrument or part whose serial number is not legible enough.
- Others not caused by instrument or part itself.

Safety Information



Danger

Indicates an imminent hazard that, if not avoided, will result in death or serious injury.



Warning

Indicates a potential hazard or unsafe practice that, if not avoided, could result in death or serious injury.



Caution

Indicates a potential hazard or unsafe practice that, if not avoided, could result in minor personal injury or product/property damage.

Note

Provides application tips or other useful information to ensure that you get the most from your product.

Product information

Product Name: **D-Tiger™ Emergency Ventilator**

Mode: **All6000A**

Manufacturer: **Ambulanc (Shenzhen) Tech. Co., Ltd**

Manufacturer address: 3rd Floor, Block C, Building #5, Skyworth Innovation Industry Park, Tang Tou 1st Road, Shiyan Town, Baoan District, 518108 Shenzhen, China



Warning

This device is not intended for home using!

Company Contact

Manufacturer: Ambulanc (shenzhen) Tech.Co., Ltd.

Address: 3rd Floor, Block C, Building #5, Skyworth Innovation Industry Park, Tang Tou 1st Road, Shiyan Town, Baoan District, 518108 Shenzhen, China

Tel: +86-755-26072210

Fax: +86-755- 23016012

Website: <http://www.ambulgrou.com>

E-mail: manager@ambu-lanc.com

EC-Representative: Shanghai International Holding Corp. GmbH(Europe)

Eiffestrasse 80,20537 Hamburg,Germany

Contact Pers.: Qiming Cheng

Telephone: +49-40-2513175

Fax: +49-40-255726

Preface

Manual Purpose

This manual contains the instructions necessary to operate the product safely and in accordance with its function and intended use. Observance of this manual is a prerequisite for proper product performance and correct operation and ensures patient and operator safety.

This manual is based on the maximum configuration and therefore some contents may not apply to your product. If you have any question, please contact us.

This manual is an integral part of the product. It should always be kept close to the equipment so that it can be obtained conveniently when needed.

Intended Audience

This manual is geared for clinical professionals who are expected to have a working knowledge of medical procedures, practices and terminology as required for emergency rescue.

Illustrations

All illustrations in this manual serve as examples only. They may not necessarily reflect the setup or data displayed on your ventilator.

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1. The Basics

A: AI6000A control panel

- 1 Mask/tube ventilation switch with indicator LEDs.
- 2 Ventilation pressure gauge.
- 3 Alarm panel.
- 4 Alarm mute button.
- 5 Respiratory stalls

Symbol	Meaning
	Emergency ventilation mode — Toddler
	Emergency ventilation mode — Child
	Emergency ventilation mode — Adult
	IPPV warning mode — Please be cautious when the knob going over this symbol during usage

6 Regulator knob, ventilation parameters

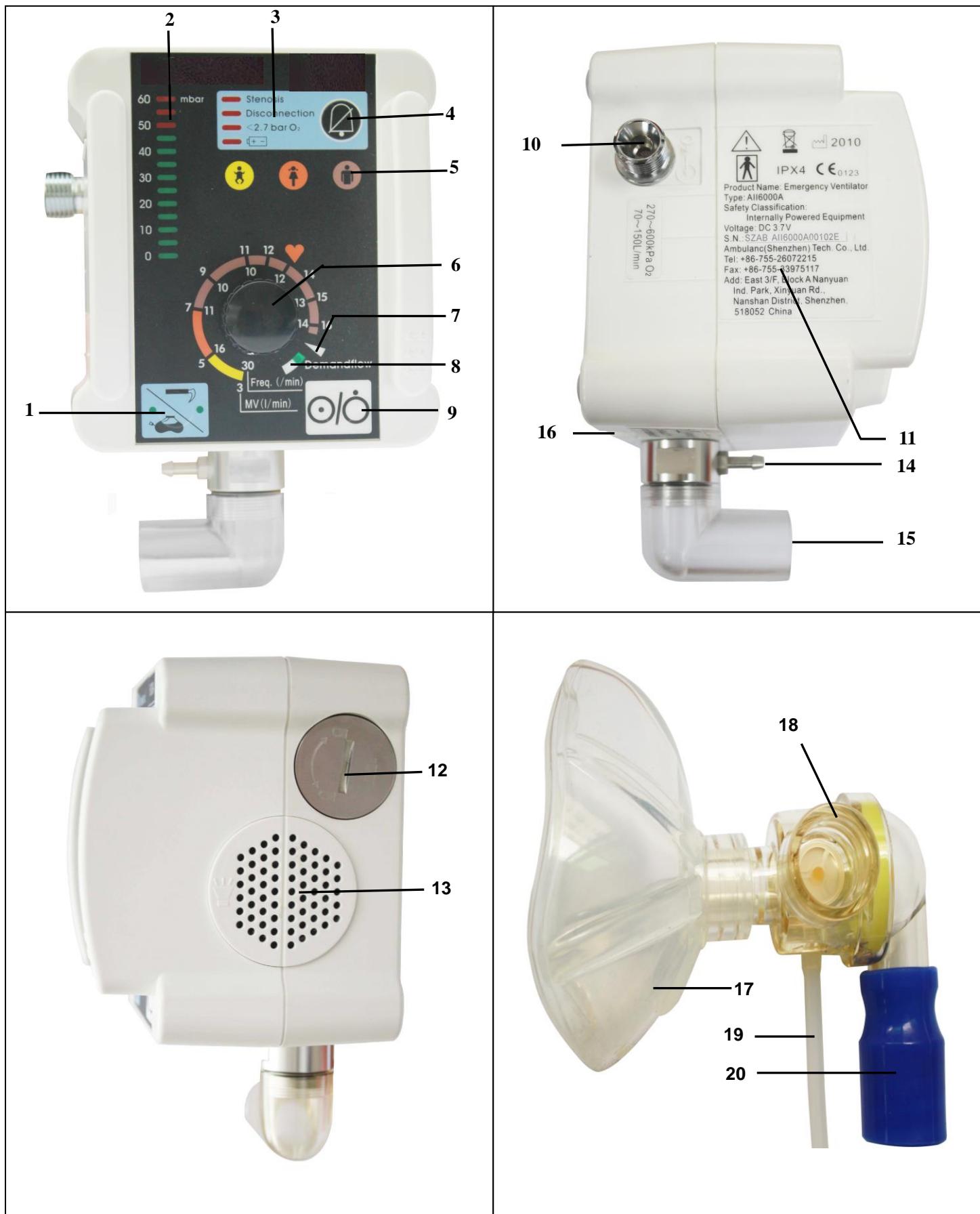
- 7 Stop notch
- 8 LED Demand flow
- 9 ON/OFF switch

B: AI6000A connections

- 10 Pressurized gas connection
- 11 Product label
- 12 Battery compartment
- 13 Speakers
- 14 Pressure gauge hose connection
- 15 Fresh air intakes
- 16 Outlets

C: AI6000A device combinations

- 17 Masks
- 18 Patient valves
- 19 Pressure pipeline
- 20 Ventilation hose



2. Description

2.1 Uses

All6000A is an automatic oxygen respiration device (short-term ventilator) with additional inhalation facility.

You can use All6000A:

- To revive patients at the site of the emergency;
- For longer periods in more protracted emergencies, e.g. fires;
- For short-term O₂ inhalation using a respiration masks.

You can use All6000A while transporting patients:

- Between the various rooms and departments of a hospital;
- Between the hospital and other premises;
- In emergencies;
- When transport over considerable distances is planned.

All6000A:

- Is designed to provide controlled ventilation to persons of 10kg body weight or more;
- Is used to treat respiratory arrest;
- Can be preset to parameters that ensure evenly balanced ventilation, provided that the selected Maximum ventilation pressure Pmax is not exceeded.
- Permits respiration-controlled oxygen inhalation in Demand mode.

2.2 Ventilation function

All6000A operates within a pressure range of 2.7 to 6 bar and at a flow rate of not less than 70l/min O₂. It has a built-in power pack.

It uses high-pressure, medicinal-grade oxygen. An external pressure reducer brings this down to the required operating pressure. The oxygen supply is fed in at input valve 10.

The ventilation settings are continuously variable. These settings (frequency and volume per minute are coupled) and the inspiration/expiration ratio of 1:1.67 are regulated by internal electronic control mechanisms.

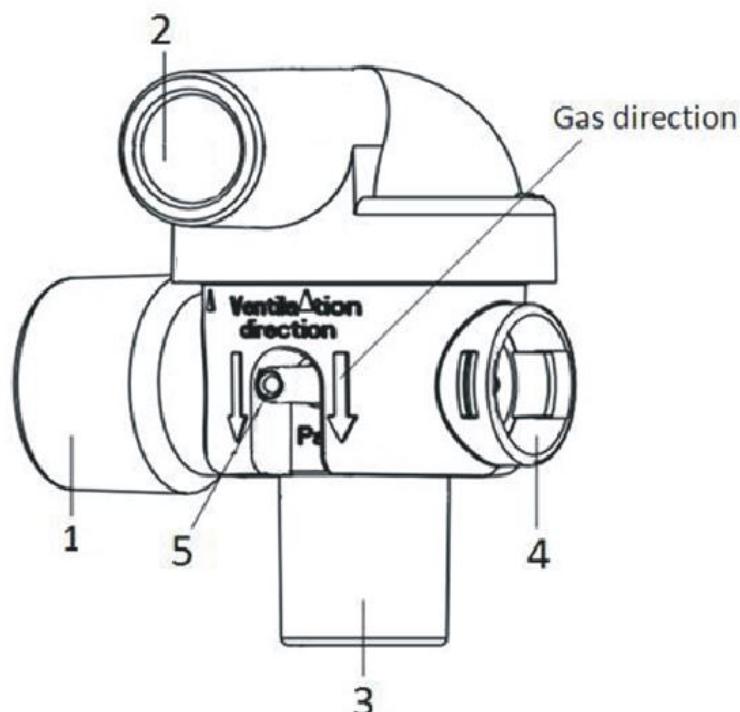
The gas for inspiration flows along the hose and through the patient valve and either the mask or tube into the patient's airways. The patient valve is fitted with a one-way valve membrane that enables expired gas to be conducted away through the outlet.

You can check the course of ventilation at ventilation pressure gauge 2.

2.3 Demand flow function

The Demand flow setting switches the All6000A breathing-controlled O₂ inhalation. Such inhalation must be carried out with the respiration mask. A small inspiration (trigger) pulse causes oxygen to continue flowing until slight overpressure interrupts the flow. Expiration then takes place via the patient valve as in ventilation.

2.4 Patient valve



1	Outlet	Φ 30mm Convex cone Interface
2	Intake	Φ 15mm/20mm Coaxial Interface
3	Patients connector (Connect to mask / intubations)	Φ 15mm/20mm Coaxial Interface
4	Emergency air intake	Non-standard interfaces
5	Pressure measurement port	Φ 5mm Non-standard cylindrical interfaces

The gas for inspiration is channeled into the patient's airways through the patient valve.

The valve is designed to enable spontaneous breathing in the event of failure of the All6000A.

When connecting the patient valve, take care to ensure that the direction of respiratory gas flow is correct (see arrow).

2.5 Audio response

The device has an audio response facility that can be switched on for user guidance, especially for users who have little practice.

If audio response is not required, a key combination can be used to switch it off

(See “5.8 Audio responses for user guidance”).

3. Safety instructions

3.1 Safety regulations

For your own safety and that of your patients, please observe the following points:

General

- Please read the directions for use carefully. They are an integral part of the ventilator and must be kept available for reference at all times.
- Continuing long time supply high concentrated oxygen will cause toxic effects, patients afford time are varied on different ages and self conditions.
- All6000A is a device driving by internal battery power.
- Working conditions:
Ambient temperature: 0°C ~ +40°C
Air humidity: Relative humidity less than 95%.
Atmospheric pressure: 70kPa ~ 110kPa.
- Use the All6000A for the described purpose only (See “2.1 Uses”).



Warning:

- Do not use the All6000A in toxic environments or where there is a risk of explosion.
- All6000A is not suitable for hyperbaric use (pressure chamber).
- Do not use All6000A with flammable anesthetics.
- A back-up ventilator should always be available in case of technical failure.
- Before starting to work with All6000A, you must understand how to operate it.
- To prevent infection or bacterial contamination, please observe section “6. Hygienic preparation”.
- All6000A should be used only by medically qualified personnel who have had training in ventilation techniques. Incorrect use can cause severe physical injury.
- This Equipment should be stored at ambient temperature -40 °C ~ + 50°C, relative humidity less than 95%, and no corrosive gases and well-ventilated room.
- Only trained medical staff can operate this ventilator.

- Can cause explosive reactions when high-pressure oxygen and combustible material(grease, oil, alcohol, etc.) meet.
- This equipment is only suitable for patients weight more than 10KG.

NOTE:

- Please note that a safe distance must be maintained between All6000A and equipment that emits HF radiation (e.g. mobile phones), otherwise malfunctions may occur.
- We recommend that maintenance work such as inspections and repairs be performed only by the manufacturer: Ambulanc, or by qualified technicians expressly authorized by Ambulanc.
- Malfunctions and a lack of biocompatibility may result if third-party articles are used. Please note that in such cases all warranty entitlement and liability claims shall be void where items other than the accessories recommended in the instructions for use or original spare parts are used.

Oxygen

**Warning:**

- Spontaneous explosive reactions can occur if high-pressure oxygen comes into contact with flammable substances (fat, oil, alcohol etc.):
- Keep the equipment and all screw connections absolutely free from oil and grease.
- Always wash your hands before starting to work on the oxygen supply.
- Smoking and open flames are strictly prohibited in the vicinity of all fittings containing or transporting oxygen.
- During assembly and when changing the oxygen cylinder, only hand pressure should be used when tightening the screw connections to the cylinder and to the pressure reducer. Never use tools for this purpose. Excessive tightening damages the screw threads and seals, and can cause leaks.
- Protect oxygen cylinders from accidental falls. If a cylinder falls over, the pressure reducer or the valve may break off and cause a violent explosion.

**Warning:**

- Always open the valve of the oxygen cylinder slowly to prevent pressure damage to the other fittings.
- The oxygen cylinder should never be completely emptied, as this may allow air containing moisture to enter the cylinder and cause corrosion.

Ventilation/Operation



Caution:

- Both patient and ventilator must be kept under constant observation during ventilation.
- Make sure that neither the outlet nor the emergency air intake on the patient valve are blocked or their function impeded in any other way, e.g. by the patient's position.

Software:

- Extensive validation tests have been performed to minimize risks arising from software errors.

Accessories:

- Please protect the silicone and rubber components from UV radiation and prolonged exposure to direct sunlight, as this can make them brittle and friable.

Adjustable knob:



- The effective adjustable area of the knob is situated in the colorized scale of operation panel only (the yellow, orange, brown, green and white area on above figure), and other region is strictly forbidden to access.



Warning:

- It is strictly forbidden turning the knob into non-operating area which is indicated by the red line and arrow in the illustration above with brute force, it will disturb the preset output parameters, and may cause damage to the device.
- Before starting the device, please rotate the knob counterclockwise softly, when it encounter an obvious resistance, stop rotating and check whether

the indicating on the knob is aligned with the lower left edge of yellow colorized scale. If not, the device may exist problem, please stop using and contact the manufacturer or the Ambulanc authorized personnel.

4. Installation

A permanent mounting is usually necessary only when AII6000A is installed as a fixture in rescue vehicles, helicopters or aircraft .If AII6000A is supplied complete on a carrying platform or in an emergency rucksack, it is ready for use and requires no further installation. Separate directions for use are supplied for carrying platforms and emergency rucksacks.



Caution:

In order to ensure safe and reliable operation, functional tests must be carried out after installation (see "7. Functional checks").

4.1 Connecting the oxygen cylinder



Caution:

Always wash your hands thoroughly before starting any work on the oxygen supply. Products containing hydrocarbons (e.g. oils, greases, alcohols, hand creams, sticking plasters) may cause explosive reactions if they come into contact with high-pressure oxygen.

Never use wrenches or similar tools to tighten or loosen the screw connections.

Removing the empty cylinder

1. Close the valve of the oxygen cylinder. Switch on AII6000A with ON/OFF switch 9. This exhausts any residual oxygen and depressurizes the ventilator. Wait until the pressure gauge on the pressure reducer shows an oxygen content of zero before undoing the screw connection by hand.
2. Switch off AII6000A with ON/OFF switch 9.
3. Then loosen the screw of reducing valve connected to the cylinder.

Connecting the new cylinder

1. First briefly open and close the valve of the new oxygen cylinder. This should blow out any particulate matter.



Caution:

Keep the valve opening away from the body, making sure that neither yourself nor other persons can be injured by escaping particles.

2. Next use the fluted connecting nut to couple the pressure reducer to the valve on the oxygen cylinder. Tighten the connecting nut by hand.



3. If the pressure hose is not already connected to the exit from the pressure reducer, make this connection with the 9/16"-18UNF connecting nut.
4. Screw the other end of the pressure hose on to pressurized gas connection **10** on the AIIB6000A if this has not yet been done.

4.2 Ventilation hose



1. Slide the pressure gauge hose onto connection **14**.
2. Slide the ventilation hose onto connection **15**. Make sure that this does not cause any kinks in the pressure gauge hose already connected. If necessary, turn the ventilation hose while sliding on as appropriate.

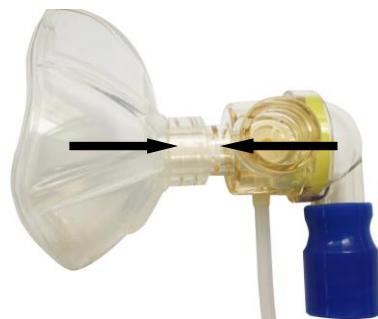


Caution:

Always grasp the ventilation hose and pressure gauge hose by their end only (position of arrow in adjacent drawing), otherwise they may be damaged or split.



3. Connect the patient valve to the other end of the ventilation hose and pressure gauge hose.



4. If a mask is being used for ventilation, attach the mask connection to the patient valve (identical with hose connection), or if the patient is intubated, attach the patient valve to the hose.

Warning:



Please use the ventilation hose which is supplied by the manufacturer Ambulanc, otherwise Ambulanc is not responsible for any adverse effect on the product performance.

If you are using the disposable patient ventilation hose, please discard it after using.

4.3 Wall mounting set

A wall mounting set is available for permanent fixing, e.g. on a vertical surface inside a vehicle.

Please refer to the sheet enclosed with the wall mounting set for details of dimensions and installation procedure.

4.4 Please check as below advised carefully before using

- Check power alarm status.
- Check Respiratory Valve for patients.
- Check trigger pressure.
- Check the stenosis alarm.(see “7.4 Checking the alarm systems”)
- Check the disconnection alarm. (see “7.4 Checking the alarm systems”)
- Check the drop in O2 pressure alarm. (see “7.4 Checking the alarm systems”)

5. Using the ventilator

5.1 Switching on / self test

1. Open the valve of the oxygen cylinder slowly. The pressure gauge will now show the pressure in the cylinder.
2. Where appropriate, calculate how long the remaining oxygen will last (see “5.9 Calculation of oxygen content/remaining operating time”). Always change the cylinder in good time, e.g. when the pressure is lower than 50 bar, to ensure that oxygen is available for an adequate period.
3. Select the desired ventilation settings (see “5.2 Selecting the ventilation settings”).
4. The ventilator will run a power on self test in the first 3 seconds when you switch on the device with ON/OFF switch 9, and remind you with the audio advice - “Open Oxygen Cylinder”. If the audio response is enabled, the ventilator will broadcast operation navigation following; if not, then there is no voice prompt for operation.

During this test, the four LEDs in alarm panel 3 flash on and off and a short alarm tone sounds.



Warning!

If an error is found during self test, the individual LEDs of 50, 55 and 60 in ventilation pressure gauge2 will keep flashing approx.5 seconds then the machine will enter into working state, but no oxygen supply. ***The device must not be used for ventilation at this circumstance!***

If audio response is enabled, you should hear the message “Device malfunction! Administer alternative ventilation”.

After the self test, the ventilator repeatedly checks the oxygen cylinder pressure until adequate pressure is detected. Otherwise an alarm is sounded.

The All6000A will then start to function with the selected ventilation settings.

5.2 Selecting the ventilation settings

We recommend selection before switching on, to prevent unnecessary waste of oxygen.

Respiratory frequency and minute volume

Set the respiratory frequency and the minute volume with regulator knob 6

Recommended ventilation settings:

	Yellow	Orange	Brown					
Body Weight	10Kg	30Kg	60Kg	80Kg	Above 110Kg			
Respiratory frequency	30bpm	16bpm	11bpm	10bpm	10bpm	13bpm	14bpm	
Minute volume	3L/min	5L/min	7L/min	9L/min	11L/min	15L/min	16L/min	

The figures shown in the table are only recommendations. Different settings may be required in cases of pulmonary damage or for special indications.

To see the relationship between the values, see diagram “11.3 Relationship between ventilation parameters”.

Maximum ventilation pressure

Use the mask/tube switch 1 to set the maximum ventilation pressure. The LEDs light up in active mode.

Recommended maximum ventilation pressure

Mask ventilation 	Intubations 
20 mbar	45 mbar
Audio response enabled: “Mask ventilation mode. Tilt the head back, secure mask tightly”	Audio response enabled: “Tube ventilation mode. Ventilation pressure limit 45 mbar”

If the maximum level is reached, e.g. in cases where compliance is inadequate, All6000A sets off a stenosis alarm.

NOTE:

The mask/tube switch 1 can be operated only when the ventilator is switched on.

5.3 Performing ventilation

Ventilation mask

1. Attach the mask to the patient valve.
2. Place the mask over the patient's mouth and nose.
3. Tilt the head back and ensure the mask is hermetically sealed.

NOTE:

Use this model if patient can autonomous respiration.

Intubation

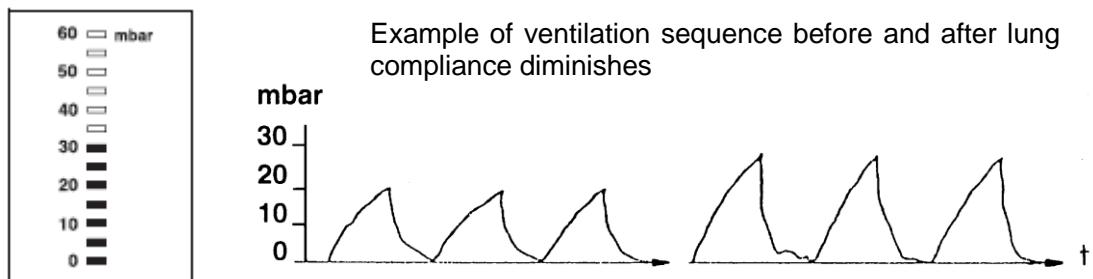
The patient will normally be intubated before the hose is connected to the

patient valve.

NOTE:

Use this model when patient can not spontaneous breath, this model is invasive breathing.

5.4 Monitoring ventilation



The patient must be monitored constantly during ventilation.

You can check the course of ventilation at ventilation pressure gauge 2.

High airway resistance, e.g. as a result of obstructions or external cardiac massage, affects the minute volume. If the preset maximum ventilation pressure is exceeded in two successive inspiration phases, you should use a respirometer to check the ventilation volume actually being received by the patient. The respirometer can be attached to the outlet on the patient valve with an adapter. Monitor the respiratory parameters during ventilation.

If lung compliance diminishes during ventilation, the ventilator will react by increasing the ventilation pressure at constant volume.

5.5 Demand Flow

NOTE:

A PEEP valve must not be fitted when using the ventilator in Demand Flow mode.

Demand Flow must be switched on for O₂ inhalation.

To switch the All6000A to Demand flow mode, turn the ventilation settings regulator knob 6 until it engages in the fixed point marked by the white triangle. The green LED 8 indicates that it is ready for operation. If audio response is enabled, the ventilator announces "Demand Flow mode".

Attach the mask to the patient valve and place it over the patient's mouth and nose. Hold the mask to ensure a firm seal. The flow is switched on by the patient breathing in (triggering the device). When the patient starts to breathe out, the flow stops and the expired air is removed via the patient valve. The patient should breathe calmly and evenly. The Demand Flow cannot be altered.

At higher breath rates, fresh air is automatically mixed in with the oxygen. This is done via the emergency air intake of the patient valve.

The Demand Flow mode is ended by turning the regulator knob back to ventilation mode from the index position marked by the white triangle, or by switching off the ventilator.

If audio response is activated, the ventilator confirms the return to ventilation mode by announcing: "Mask ventilation mode. Tilt back head, secure mask tightly".

NOTE:

Lock 7 is used to distinguish between Demand Flow mode (on-demand flow mode) and IPPV mode (volume control mode or spontaneous respiratory mode) to remind and prevent false switching between the two modes.

5.6 Terminating ventilation or Demand Flow

1. Check the oxygen supply on the pressure reducer gauge. Always change the cylinder in good time, e.g. when the pressure is lower than 50 bar, to ensure that oxygen is available for an adequate period.
2. Close the valve of the oxygen cylinder.
3. Switch off the All6000A. To prevent the ventilator being switched off unintentionally, ON/OFF switch 9 must be kept pressed down for at least 3 seconds until the LEDs in the alarm panel 3 light up. The ventilator announces: "Close oxygen cylinder".



Warning:

Never empty the oxygen cylinder completely. Return the cylinder for filling while it still contains residual pressure. This prevents entry of moist atmospheric air that can cause corrosion.

5.7 Alarm signals

Alarm panel 3 signals the following alarms:

Stenosis:

Stenosis, or maximum ventilation pressure Pmax reached in two successive inspiration phases

Disconnection:

Disconnection between All6000A and patient in two successive inspiration phases

< 2,7 bar:

Drop in oxygen pressure to below 2.7 bar



All the visual alarms are accompanied by an acoustic alarm.

If the ventilator detects a malfunction during the self test after switching on or during continuous operation, the LED light of ventilation pressure gauge on the top left of panel will keep flashing for 5 seconds on 50, 55, and 60 positions, and then enter into working mode.

If audio response is enabled, you will hear the message “Device malfunction! Administer alternative ventilation”.

In this case you must not use the All6000A.

The patient valve is designed to enable spontaneous breathing in the event of equipment failure.

When is the alarm set off?

An alarm signal is given as soon as any one of the functional problems mentioned above occurs. The relevant LED starts flashing and an acoustic signal sounds. If audio response is enabled, the user also hears additional information about the individual alarm.

Simultaneous disconnection and drop in oxygen pressure will initially set off only the < 2.7 bar alarm.

Stenosis alarm

Actual ventilation pressure exceeds the maximum ventilation pressure (20 or 45 mbar).

All6000A briefly switches to expiration if the maximum ventilation pressure is exceeded, but then tries to continue inspiration in the same inspiration phase.

If the maximum ventilation pressure is exceeded for a second time during the same inspiration phase, the unit finally switches to expiration and vents the patient tube system completely. The next inspiration begins with the following ventilation stroke according to the frequency selected. This does not affect the set frequency.

The alarm is set off if airway resistance is exceeded in two successive inspiration phases. This is intended to prevent false alarms, e.g. due to coughing.

If audio response is enabled, the unit announces “Check airways and minute volume”.

Disconnection alarm

As a rule this alarm is due to interruption of the breathing system.

The alarm is set off when the rise in pressure fails to reach at least 3 mbar in two successive inspiration phases.

If audio response is enabled, the unit announces “Check ventilation system and settings”.

Disconnection alarm in Demand Flow mode

If the patient does not trigger All6000A within 15 seconds, the “Disconnection” alarm is given. If audio response is enabled, the unit announces “Rule out respiratory arrest and check mask fit”.

< 2.7 bar O₂ alarm

Oxygen pressure at the pressure connection to the All6000A has dropped to less than 2.7 bar. The reason is usually an almost empty oxygen cylinder.

In this case All6000A can no longer function correctly because the operating parameters are no longer within the permissible limits.

If audio response is enabled, the ventilator announces: “Check pressure hose system and gas supply”.

:Alarm

The battery is failing. Failure of the automatic ventilation function must be expected. Immediate steps must therefore be taken to provide alternative ventilation (see “5.10 Alternative ventilation procedures”).

If audio response is enabled, you will hear the message: “Device malfunction! Administer alternative ventilation”.

The ventilator must be switched off before the battery can be changed (see “Changing the battery”).

Canceling acoustic alarm

The acoustic alarm can be temporarily cancelled by pressing alarm acknowledgement 4:

Stenosis: 30 seconds

Disconnection: 30 seconds

< 2, 7 bar: 30 seconds

 : 120 seconds

Even if audio response is enabled, no messages will be output for the periods stated. The visual alarm will continue to flash.

If the cause of the alarm is not eliminated, the acoustic alarm will start to sound again

after a short interval. Audio response will also resume automatically.

Both the visual and acoustic alarms are cancelled automatically as soon as the malfunction is eliminated.

5.8 Audio response for user guidance

Selecting language / Switching off audio guidance

The language setting can only be selected if the unit is switched off.

To select a language or to switch off the audio response facility, proceed as follows:

1. Press and hold the mask/tube switch 1. Switch on the ventilator at the ON/OFF switch 9 then the message “Selected language” will be heard.
2. Then release the mask/tube switch 1. The unit is now in the language selection menu. The ventilation pressure gauge displays the most recent language setting. The following meanings are assigned to the individual LEDs .

mbar	Meaning
20	Audio response on (no voice)
15	Audio response off
10	English
5	Chinese

3. Press mask/tube switch 1 as many times as necessary until the LED for the desired language lights up and a corresponding message is heard (example: LED 10 mbar, language: English, message: “English”).

Then press the alarm mute button 4, the new selection is stored. Press the ON / OFF switch 9 about 3 seconds to exit the language setting. The LED for the selected language goes out.

Select the setting 15 (15 mbar) if you want to switch off the audio response facility. You will then hear the message: “Audio response is off!” in the language most recently selected, then all the other voice prompt will be turned off except “Open oxygen cylinder” and “close oxygen cylinder”. Select the setting 20(20mbar) If you want to switch on the audio response facility. (Note: there is no accompanying Audio response to advise audio response is on). After pressing mute alarm 4, the new setting is automatically stored. Press the ON/OFF switch 9 about 3 seconds to exit the wizard language setting, the LED for the selected language goes out.

NOTE:

The audio alarm will not be closed in either setting!

Audio response messages

The following is a list of the individual audio response messages with notes on what they mean:

Table 1:

Audio response	Meaning
“Turn on oxygen cylinder”	Open oxygen cylinder valve slowly .
“Check respiration and select mode”	Depending on whether or not the patient is breathing, set All6000A to one of the modes Demand Flow, mask ventilation or intubation.
“Adjust settings”	Depending on patient weight, set respiration frequency and minute volume.
“Connect patient”	Connect patient to ventilator via ventilation hose and patient valve using the patient mask or the connector of the tracheal tube.
“Demand Flow mode”	Demand Flow mode is selected.
“Mask ventilation mode” “Tilt head back” “Secure mask tightly”	Mask ventilation mode is selected. While tilting the head back, use the hands to seal the mask.
“Tube ventilation mode” “Ventilation pressure limit 45 mbar”	Tube ventilation mode is selected. Maximum ventilation pressure for tube ventilation.
“Check airways and minute volume”	All6000A has measured excessive airway resistance. Check the airways or adjust respiratory frequency and minute volume settings to suit the patient.
“Device malfunction” “Administer alternative ventilation”	The device is faulty or the battery is failing. The device can no longer be used for ventilation. You must therefore use another ventilation method.
“Check pressure hose system and gas supply”	All6000A has measured low pressure on the inlet side. Check whether the O2 cylinder still contains sufficient oxygen and that the oxygen hose is not leaking, kinked or jammed.
“Rule out respiratory arrest and check mask fit”	All6000A can no longer detect a breathing pulse (trigger) in Demand Flow mode. Check the patient's breathing, and if necessary switch to a different ventilation mode. Check the connections and mask fit.
“Close oxygen cylinder”	After switching off the ventilator, turn off the O2 cylinder or the external O2 supply.
“Check ventilation system and settings”	Disconnection: a pressure rise of 3 mbar is not achieved during the inspiration phase under controlled ventilation. This is usually due to an interruption of the ventilation system or to a low minute volume setting. Check the connections

	or adjust the minute volume to suit the patient.
"Selected language:Chinese"(English)	When selecting the language for the audio response, press the mask/tube switch 1 as many times as necessary until the desired language is announced.
"Audio response is off"	Confirmation that audio response is deactivated.

5.9 Calculation of oxygen content/remaining operating time

Oxygen content of cylinder

Oxygen volume = volume of cylinder x cylinder pressure.

	Cylinder volume	x cylinder pressure	= oxygen content
Example 1	10 L	x 200 bar	= 2000 L
Example 2	10 L	x 100 bar	= 1000 L

Real ventilation time

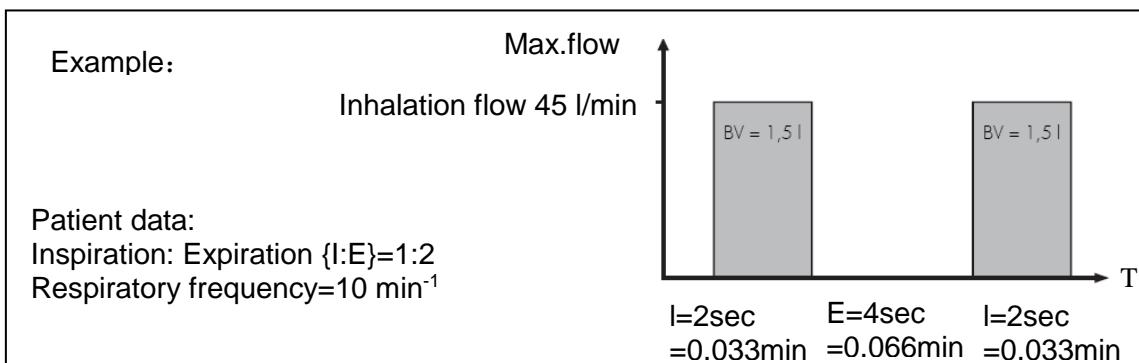
Real ventilation time (min) =oxygen content (L)/MV(L/min)

Example: O₂ content = 1000 L; MV = 11 L/min.

This gives the following equation:

Real ventilation time =1000 L/11L/min= 91 min = 1 h 31 min

Real Demand Flow time



Breathing volume (AZV) = inhalation flow × inhalation time

For the above example:

Breathing volume=45L/min×0.033min=1.5L

Minute volume (MV) =respiratory frequency × AZV

For the above example:

Minute volume (MV) =10min⁻¹×1.5L=15L/min

Real Demand Flow time(min)=Oxygen content(L)/MV(L/min)

Example: O₂ content= 2000L, MV=15L/min.

This gives the following equation:

Real Demand Flow time= 2000L/15L/min=133 min= 2h 13min

5.10 Alternative ventilation procedures

If All6000A ceases to function during a ventilation procedure, the following alternatives can be applied:

Ventilation bags

1. Remove the patient valve from the tube or the mask.
2. Replace it with the ventilation bag, and perform manual ventilation.

Exhaustion of oxygen supply

In emergency situations when the oxygen supply runs out, All6000A can also be operated with respiratory air.

6. Hygienic preparation

After every use the AII6000A and any accessories used must undergo hygienic preparation.

Be sure to carry out a functional check after every hygienic preparation (see "7. Functional checks").

6.1 AII6000A

You can keep AII6000A clean by simply wiping with disinfectant as described in section 6.6.

Never immerse AII6000A in disinfectants or other liquids. Otherwise damage may be caused to the unit, thus endangering users and patients.

6.2 Patient valve

1. Disconnect the patient valve from the hoses.
2. Always grasp the hoses by their ends. Otherwise you might damage or tear them.
3. Dismantle the patient valve. It is neither necessary nor permissible to remove the membrane in the emergency air intake for cleaning and disinfection.
4. Crinkled, misshapen and sticky valve membranes must be replaced.
5. Perform the hygienic preparation as described in section 6.6.
6. Reassemble the patient valve. When reassembling, make sure that the one-way valves membrane is correctly positioned.
7. Always perform a functional check before using the valve again (see "7.3 checking the patient valve")

6.3 Ventilation hose

1. Take the ventilation hose and the pressure gauge hose off both connection ports.



Caution!

Always grasp the hoses at the end, as shown in the drawing, otherwise the hoses may be damaged or torn off. Close both ends of the pressure gauge hose.

2. Perform the hygienic preparation as described in section 6.6.
3. For reassembling, see "4.2 Ventilation hose".

6.4 Masks

Perform the hygienic preparation of the masks as described in section 6.6.

6.5 Fittings

For external cleaning of fittings (e.g. pressure reducer, valve), use only a clean cloth. The cloth may be dry or moistened with clean water.

Never immerse the fittings in disinfectants or other liquids. You may only disinfect them by wiping. On no account may liquid get into the pressure reducer, as this could cause explosions.

6.6 Cleaning and disinfection procedure

Hygienic preparation of the AII6000A and the accessories used should be performed as described in the following table.

Observe the instructions for the disinfectant used. You are recommended to wear suitable gloves (e.g. household or disposable gloves) during disinfection procedures.

Description of component	Cleaning	Disinfection	Rinsing in washing machine	Sterilization
AII6000A	With a dry or damp cloth	Wiping	Not permissible	Not permissible
Patient valve		Immerse in dilute solution, so that all surfaces, inside and out, are thoroughly wetted without bubbles. Wait until the full exposure time has elapsed. After disinfection, rinse all parts thoroughly inside and out with distilled water and leave to dry	Rinsing programmed up to 93°C (thermal disinfection in automatic cleansing unit)	Sterilization with superheated steam at 134°C in units complying with EN285, residence time 5 minutes.
Reusable respiratory mask	In warm water with a mild household detergent			
Ventilation hose				
Oxygen fittings	With a dry or damp cloth	Wiping	Not permissible	Not permissible

To disinfect the pressure gauge hose of the ventilation hose, proceed as follows:

1. Connect one end of the pressure gauge hose to a sterile disposable 20-ml syringe.
2. Immerse the other end in the dilute disinfectant solution.
3. Draw the disinfectant solution through the pressure gauge hose into the syringe until the latter is full. Do not flush through the pressure gauge hose in

the opposite direction!

4. Detach the syringe from the pressure gauge hose and empty it out completely.
Repeat the procedure 5 more times.
5. After disinfection, the pressure gauge hose must be rinsed with distilled water at least 8 times using the same principle.
6. You can support the subsequent drying process with medical compressed air or medical oxygen.



Caution!

Then allow the components to dry thoroughly. If any water is left in the patient valve or the pressure gauge hose of the ventilation hose, the unit may not function correctly.

7. Functional checks

Before each use, after each dismantling and reassembly, and at the very least every 6 months, the user must carry out functional checks on the ventilator.

NOTE:

Before carrying out the functional check on AII6000A, you must connect the ventilation hose and the patient valve.

AII6000A must not be used if the functional checks reveal defects or deviations from the specified parameters.

First try to correct the error with the help of the information provided in section “8. trouble shooting”. If this is not possible, have the unit repaired by the manufacturer – Ambulanc – or by specialists explicitly authorized by Ambulanc.

A complete functional check includes:

- “7.2 Checking for leaks in the system;
- “7.3 checking the patient valve”;
- “7.4 Checking the alarm systems”;

We recommend that you always hold reserve stocks of the following items:

- replacement washers for the connections;
- one-way valve membrane membranes for the patient valve.

7.1 Intervals

Before each use:

- Perform a functional check.

After each use or dismantling:

- Clean, disinfect or sterilize the ventilator and its components (see “6. Hygienic preparation”);
- Check the one-way valve membrane in the patient valve (see “7.3 Checking the patient valve”). It must not be crinkled, sticky or misshapen.
- Perform a functional check.

At least every 6 months, if the ventilator has not been used in the meantime.

- Perform a functional check.

7.2 Checking for leaks in the system

1. Open the valve of the oxygen cylinder slowly. You can now read the pressure in the cylinder from the gauge on the pressure reducer. For example, a reading of 200 bars means that the cylinder is full, whereas 100 bars mean it is half full.

NOTE:

Always change the cylinder in good time, e.g. when the pressure is lower than 50 bar, to ensure that oxygen is available for an adequate period.

2. Close the cylinder valve again.
3. Watch the needle of the gauge on the pressure reducer for approx. 1 minute. If it stays in the same place, the system is free of leaks. If the needle drops steadily, there is a leak somewhere.

Repairing leaks

1. Prepare a soap/water solution using non-perfumed soap.
2. Wet all the screw and hose connections with the solution. Bubbles will form at the site of the leak.
3. Depressurize the system:

To do this, first close the oxygen cylinder. Switch on All6000A briefly until the pressure gauge on the O2 cylinder reads “0”. Then switch off All6000A again.

4. If leaks are discovered, the defective components must be changed.
5. After changing, make a fresh check for leaks.
6. If it proves impossible to eliminate the leak, the ventilator will have to be repaired.

7.3 Checking the patient valve

1. Dismantle the patient valve.
2. Carry out a visual check of all components for cracks or other physical damage. The one-way valve membrane must be replaced if it is crinkled, sticky or misshapen. It must no longer be used for ventilation as it could cause serious functional problems.

Also perform a visual check of the valve membranes in the outlet and the emergency air intake interface. To do so, there is no need to dismantle the valve membranes. Crinkled, misshapen or sticky valve membranes must be replaced, however, as they can lead to considerable malfunctions.

3. Reassemble the patient valve.



Caution!

When reassembling, make sure that the one-way valve membrane is correctly positioned.

7.4 Checking the alarm systems



Warning:

In the case of the stenosis alarm and the disconnection alarm, the alarm signal (or message) is only set off when the cause of the alarm is repeated in two successive inspiration phases. This prevents the alarm being triggered by a very short-lived dysfunction.



Warning:

In this test the rise in pressure is so strong that the pressure gauge needle may overswing into the red zone. There are technical reasons for this, and it does not indicate any malfunction.

Stenosis

1. Open the oxygen cylinder.
2. Remove the tube or the ventilation mask from the patient valve.
3. Switch on All6000A.
4. Switch the mask/tube switch 1 to mask ventilation mode.
5. Keep the ventilation connector on the patient valve closed with the flat of your hand during two successive inspiration phases. The stenosis alarm should be set off. If audio response is enabled, the ventilator announces "Check airways and minute volume".

Disconnection (interruption of breathing system)

1. First proceed as for the stenosis alarm.
2. Then remove your hand. The stenosis alarm should now cease (LED goes out, acoustic alarm stops sounding).

After two successive inspiration phases the disconnection alarm should be set off. If audio response is enabled, the ventilator announces "Check ventilation system and settings".

Drop in O₂ pressure (<2.7 bar O₂)

1. Open the valve of the oxygen cylinder slowly.
2. Switch on All6000A.
3. Close the valve on the oxygen cylinder. When the oxygen pressure in the

system has fallen below 2.7 bar, the <2.7 bar O2 alarm should be set off.
If audio response is enabled, the ventilator announces “Check pressure hose system and gas supply”.

Power supply ()

The alarm that indicates a failing battery is checked automatically in the self test that runs when All6000A is switched on.

The power supply is in order if no alarm is set off when the valve on the oxygen cylinder is opened and All6000A is switched on and starts to function.

8. Troubleshooting

Fault	Cause	Remedy
All6000A will not switch on.	All6000A defective.	Arrange for repair.
	Battery failing.	Replace battery in battery compartment. If ventilator still refuses to switch on, have internal auxiliary battery replaced by manufacturer or authorized specialists.
Stenosis alarm (excessive airway resistance)	Airways obstructed.	Remove obstruction.
	Kink or obstruction in ventilation hose/mask/tube.	Remove kink or obstruction; if necessary replace parts.
	Tube incorrectly positioned.	Correct tube position.
	All6000A defective.	Arrange for repair.
Disconnection alarm (Breathing system interrupted).	Ventilation hose leaking/slipped out.	Check connections.
	Mask/tube incorrectly positioned.	
	Pressure gauge hose leaking/slipped out.	
	All6000A defective.	Arrange for repair.
< 2.7 bar alarm (oxygen pressure too low).	Oxygen cylinder nearly empty.	Change O2 cylinder.
	Oxygen valve closed.	Open oxygen valve.
	Pressure reducer defective.	Replace pressure reducer.
	Kink or blockage in oxygen hose.	Take corrective action.

Fault	Cause	Remedy
Alarm.	Battery failing or fuse defective.	Replace battery in battery compartment. If ventilator still refuses to switch on, have internal auxiliary battery replaced by manufacturer or authorized specialists.
Visual alarms flashing, but no acoustic alarm and no audio response.	Short-term electronic problem or defect in electronic system.	Switch off, then on again. If error recurs, arrange for repairs.
Acoustic alarm, but no visual alarm flashing.		
Alarm: Device malfunctions.	Device defective.	
No audio response.	Audio response deactivated.	Activate audio response.
Pressure gauge not reading "0".	All6000A defective.	Arrange for repair.
All6000A will not switch off.	Operating error.	Keep button pressed for at least 3 seconds.
Unusually high oxygen consumption.	Leak in oxygen supply.	Find and eliminate leak
MV too low..	Ventilation parameter(s) incorrectly set	Check ventilation parameter(s).
	All6000A defective.	Arrange for repair.
All6000A is functioning, but without any displays.	Pressure gauge hose on All6000A or on patient valve slipped off. Kink in pressure gauge hose.	Check pressure gauge hose.

9. Servicing

9.1 Intervals

NOTE:

Always remember to carry out a technical safety check on the ventilator after every repair. All6000A must undergo a technical safety check and servicing at regular intervals.

After each using:

Cleaning and disinfecting reusable ventilation hose and patient valve according to the instruction in Chapter VI.

Every 1 year:

Every 1 year a technical safety check must be performed on the cleaned and disinfected unit according to Chapter 6, including ventilation hose and patient valve. At the same intervals, servicing is to be performed either by the manufacturer or by a specialist expressly authorized by the manufacturer.

Every 2 years:

Servicing the fittings in the oxygen supply system (e.g. pressure reducer) by the manufacturer or by a qualified specialist authorized by the manufacturer.

9.2 Performing technical safety check and servicing

We recommend that maintenance work such as inspections and repairs be performed only by the manufacturer, Ambulanc, or by qualified technicians expressly authorized by Ambulanc

The following points are to be covered during technical safety check and servicing:

- Check equipment for completeness;
- Visual check;
- mechanical damage;
- labeling of controls;
- damage to all external hoses;
- Replace wear parts: battery, valve seals etc.;
- Check system components: carrying platforms, oxygen fittings, secretion suction system, hose connections etc.
- Check test bag;

9.3 Battery

All6000A is equipped with one battery:

- Battery (Li-ion battery 3.7 V) for power supply. It can be changed by the operator.

In room temperature environment the full power battery's working time is up to 10 hours.

We recommend having the batteries changed only by the manufacturer –Ambulanc– or by qualified specialists expressly authorized by the manufacturer. Special precautions need to be taken during the change in order to protect the electronic system.

In an emergency, proceed as follows:

Changing the battery

1. Make sure the ventilator is switched off.
2. Open the battery compartment on the side of the All6000A (e.g. with a coin).
3. Remove the empty battery.
4. Insert the full charged battery. Make sure it is inserted the right way round.
5. Close the battery compartment again.



Warning

The 3.7 V Li-ion battery is a special battery for this unit. Use only battery supplied by Ambulanc.

If the device is not using over 3 months, we strongly recommend conducting a charge – discharge every three months.

If the device is not using over 1 year, we recommend replacing a new battery before reusing.

Note:

The adverse changes in the ambient temperature will affect battery working time.

9.4 Change valve membrane in patient valve

If one of the valve membranes in the outlet or the emergency air intake interface of the patient valve is crinkled, sticky or misshapen, it must be changed.

Emergency air intake

1. Take the emergency air intake interface out of the patient valve. To do so, push the two locking lugs out of their seat, using a small screwdriver, for example.
2. Pull the defective valve membrane out of the emergency air intake interface using pointed tweezers.
3. Put in a new valve membrane.
4. Push the emergency air intake interface back into the patient valve.

Outlet

1. Use pointed tweezers to pull the defective valve membrane out of the outlet.
2. Insert a new valve membrane.

9.5 Storage

If you do not intend to use All6000A for a long period, we recommend the following storage precautions:

1. Clean and disinfect the ventilator (see “6. Hygienic preparation”).
2. Store All6000A in a dry place.
3. The battery can remain inside the unit even for lengthy periods.



Warning

Remember that the ventilator still requires servicing at the specified intervals even when in storage; otherwise it cannot be used when removed from storage.

9.6 Disposal

To ensure proper disposal of the appliance, consult an approved electronic scrap recovery firm.

10. Product and accessories

10.1 Standard product

Accessories	Part No.	QTY(PCS)
All6000A main unit	2.601.00014	1
Reusable ventilation hose	1.703.00021	1
Patient valve	2.602.00019	1
Reusable mask(Adult)	5.000.00170	1
All6000A User manual	1.601.00024	1

10.2 Optional Accessories

Accessories	Part No.	QTY(PCS)
Pressure reducer	5.000.00169	1
Respirator air supply connection pipe	1.703.00003	1
Reusable mask(Child)	5.000.00174	1
Ventilator bag I	2.601.00017	1

10.3 Consumables

Spare parts	Part No.	QTY(PCS)
One-way valve membrane	1.402.00030	1
Reusable ventilation hose	1.703.00021	1
Li Battery	1.115.00002	1



Caution:

Specific configuration is subject to packing list

11. Technical data

11.1 Specifications

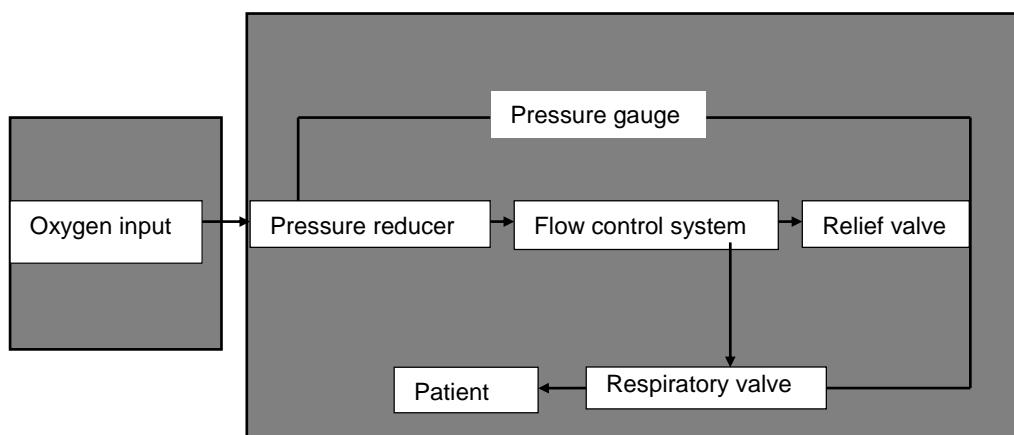
Device category	Internal power supply 
Dimensions L×H×B in mm	168×110×90 include connectors
Weight	Approx. 0.6kg
Operation: Temperature range, Humidity, Air pressure	0°C to +40°C max. 95% 70Kpa to 110 Kpa
Control	Timing pulse, volume constant
Gas input	Medical oxygen
Operating pressure	2.7 to 6.0 bar
Minimum gas volume required	70 L/min(ATPD)
Insp-exp. Ratio	1:1.67
Ventilation frequency	Continuously variable from 10 to 30 min ⁻¹
Minute volume(MV)	Continuously variable from 3 to 16 L/min(ATPD)
MV tolerances	±20%
Max. ventilation pressure	20 or 45 mbar
O2 concentration	100% O2
Pressurized gas connection	External thread 9/16-18
Ventilation hose connection	External diameter 15mm/Internal diameter 20mm

Power supply	lithium battery 3.7 V; 3 Ah, -10°C ~ +60°C
Life expectancy	
Max. charge cycles	Charge-discharge cycle 500 times
Reusable ventilation hose	Spiral silicone
Degree of protection against water	IPX4
Standards complied with	IEC60601-1 IEC60601-1-2 EN794-3 EN1789
Pressure gauge accuracy	Deviation -1～+4.99mbar
Trigger sensitivity	Deviation ±1mbar
Patient valve resistance:	
Inspiration	<6 mbar at 30、60 L/min
Expiration	<6 mbar at 30、60 L/min
Emergency air intake	<6 mbar at 15、30 L/min
Respiratory compliance	100 ml/cmH ₂ O

1. 1 bar =100kPa

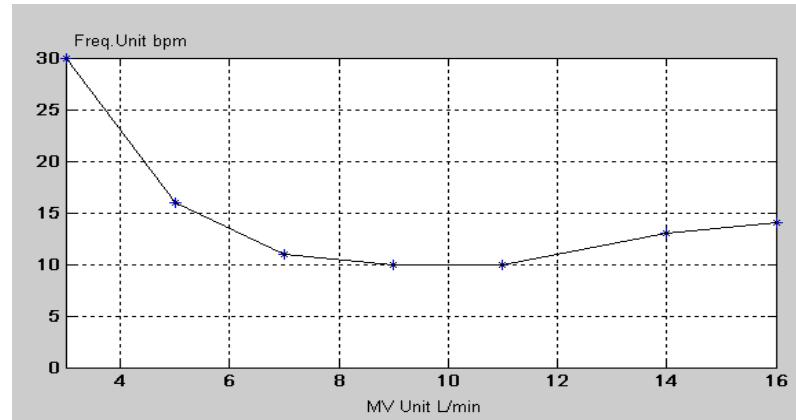
2. 1 mbar=1 hPa

11.2 Product structure diagram



11.3 Relationship between ventilation parameters

The following diagram shows the relationship between the ventilation parameters “minute volume” and “respiratory frequency”:

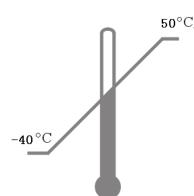


12. Warranty

- ◆ Ambulanc provides one year warranty from the date of purchasing and lifelong maintenance.
- ◆ Suggested Product's life : Three years.
- ◆ Claims against the warranty can be made only when accompanied by the sales receipt, which must show salesperson and date of purchase.
- ◆ We offer no warranty in the case of:
 - Disregard of usage instructions
 - Operating errors
 - Improper use or handling
 - Third-party intervention by non-authorized persons for the purpose of device repair
 - Acts of God, e.g., lightning strikes, etc
 - Transport damage as a result of improper packaging of returned items
 - Lack of maintenance
 - Operational and normal wear and tear, which includes, for example, the following components :
 - Filter
 - Battery
 - Articles for one-time use,etc.
 - Failure to use original spare parts.
- ◆ Ambulanc is not liable for consequential harm caused by a defect if it is not based on intention or gross negligence. Ambualnc is also not liable for minor physical injury to life or limb resulting from negligence.
- ◆ Ambulanc is not responsible for the problems happened after the product end of life.
- ◆ Ambulanc reserves the right to decide whether to eliminate defects, to deliver a defect-free item or to reduce the purchase price by a reasonable amount.
- ◆ If Ambulanc rejects a claim against the warranty, it assumes no expense for transport between customer and manufacturer.
- ◆ Implied warranty claims remain unaffected by these changes.

13. Storage and transportation

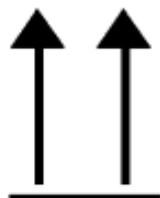
Packaged product can be transported by truck, air or railway. During the transportation, should avoid shock, severe vibration and moisture. Transport temperature is -40 °C ~ +50 °C, relative humidity should be less than 95%.



Storage temperature **-40 - 50°C**



Moisture protection



Up



Stacking layers



Handle with care



Warning!

When the storage condition is beyond the required working environment, the device should be placed in a standard environment at least 8 hours before enter into standby state.

14. EMC declaration

14.1 Guidance and manufacturer's declaration – electromagnetic emission – for all EQUIPMENT and SYSTEMS

Guidance and manufacturer's declaration – electromagnetic emission			
The A II 6000A emergency ventilator is intended for use in the electromagnetic environment specified below. The customer or the user of A II 6000A emergency ventilator should assure that it is used in such an environment.			
1	Emissions test	Compliance	Electromagnetic environment - guidance
2	RF emissions CISPR 11	Group 1	The A II 6000A emergency ventilator 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.
3	RF emissions CISPR 11	Class B	
4	Harmonic emissions IEC 61000-3-2	N/A	
5	Voltage fluctuations / flicker emissions IEC 61000-3-3	N/A	

14.2 Guidance and manufacturer's declaration – electromagnetic immunity – for all EQUIPMENT and SYSTEMS

Guidance and manufacturer's declaration – electromagnetic immunity			
The A II 6000A emergency ventilator is intended for use in the electromagnetic environment specified below. The customer or the user of the A II 6000A emergency ventilator should assure that it is used in such an environment.			
Immunity test	IEC 60601 test level	Compliance level	Electromagnetic environment - guidance
Electrostatic discharge (ESD) IEC 61000-4-2	± 6 kV contact ± 8 kV air	± 6 kV contact ± 8 kV air	Floors should be wood, concrete or ceramic tile. If floors are covered with synthetic material, the relative humidity should be at least 30 %.
Electrostatic transient / burst IEC 61000-4-4	± 2 kV for power supply lines ± 1 kV for input/output lines	N/A	Mains power quality should be that of a typical commercial or hospital environment.
Surge IEC61000-4-5	± 1 kV differential mode ± 2 kV common mode	N/A	Mains power quality should be that of a typical commercial or hospital environment.
Voltage dips, short interruptions and voltage variations on power supply input lines IEC61000-4-11	< 5 % U _T (>95 % dip in U _T) for 0,5 cycle 40 % U _T (60 % dip in U _T) for 5 cycles 70 % U _T (30 % dip in U _T) for 25 cycles < 5 % U _T (>95 % dip in U _T) for 5 sec	N/A	Mains power quality should be that of a typical commercial or hospital environment. If the user of the A II 6000A emergency ventilator Equipment requires continued operation during power mains interruptions, it is recommended that the A II 6000A emergency ventilator be powered from an uninterruptible power supply or a battery.

Power frequency (50/60 Hz) magnetic field IEC61000-4-8	3 A/m	3 A/m	Power frequency magnetic fields should be at levels characteristic of a typical location in a typical commercial or hospital environment.
NOTE: U_T is the a. c. mains voltage prior to application of the test level.			

14.3 Guidance and manufacturer's declaration – electromagnetic immunity

Guidance and manufacturer's declaration – electromagnetic immunity			
The A II 6000A emergency ventilator is intended for use in the electromagnetic environment specified below. The customer or the user of the A II 6000A emergency ventilator should assure that it is used in such an environment.			
Immunity test	IEC 60601 test level	Compliance level	Electromagnetic environment - guidance
Conducted RF IEC 61000-4-6 Radiated RF IEC 61000-4-3	3 Vrms 10 V/m 80 MHz to 2.5 GHz	N/A 10 V/m (E1)	<p>Portable and mobile RF communications equipment should be used no closer to any part of the A II 6000A emergency ventilator, including cables, than the recommended separation distance calculated from the equation applicable to the frequency of the transmitter.</p> <p>Recommended separation distance</p> $d = \left[\frac{3.5}{V_1} \right] \sqrt{P}$ $d = \left[\frac{12}{V_2} \right] \sqrt{P}$ $d = \left[\frac{1.2}{E_1} \right] \sqrt{P} \quad 80 \text{ MHz to } 800 \text{ MHz}$ $d = \left[\frac{2.3}{E_1} \right] \sqrt{P} \quad 800 \text{ MHz to } 2.5 \text{ GHz}$ <p>where p is the maximum output power rating of the transmitter in watts (W)</p>

			<p>according to the transmitter manufacturer and d is the recommended separation distance in meters (m).^b</p> <p>Field strengths from fixed RF transmitters, as determined by an electromagnetic site survey,^a should be less than the compliance level in each frequency range.^b</p> <p>Interference may occur in the vicinity of equipment marked with the following symbol:</p> 
<p>NOTE 1 At 80 MHz and 800 MHz, the higher frequency range applies.</p> <p>NOTE 2 These guidelines may not apply in all situations. Electromagnetic is affected by absorption and reflection from structures, objects and people.</p> <p>^a The ISM frequency bands between 150 kHz and 80 MHz and in the frequency range 80 MHz to 2,5 GHz are intended to decrease the likelihood that mobile/portable communications equipment could cause interference if it is inadvertently brought into patient areas. For this reason, an additional factor of 10/3 is used in calculating the recommended separation distance for transmitters in these frequency ranges.</p> <p>^b Field strengths from fixed transmitters, such as base stations for radio (cellular/cordless) telephones and land mobile radios, amateur radio, AM and FM radio broadcast and TV broadcast cannot be predicted theoretically with accuracy. To assess the electromagnetic environment due to fixed RF transmitters, an electromagnetic site survey should be considered. If the measured field strength in the location in which the A II 6000A emergency ventilator is used exceeds the applicable RF compliance level above, the A II 6000A emergency ventilator should be observed to verify normal operation. If abnormal performance is observed, additional measures may be necessary, such as reorienting or relocating the A II 6000A emergency ventilator.</p>			

14.4 Recommended separation distances between portable and mobile RF communications equipment and the EQUIPMENT or SYSTEM

Recommended separation distances between portable and mobile RF communications equipment and the A II 6000A emergency ventilator				
The A II 6000A emergency ventilator is intended for use in an electromagnetic environment in which radiated RF disturbances are controlled. The customer or the user of the A II 6000A emergency ventilator can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communications equipment (transmitters) and the A II 6000A emergency ventilator as recommended below, according to the maximum output power of the communications equipment				
Separation distance according to frequency of transmitter				
Rated maximum output of transmitter W	150 kHz to 80 MHz outside ISM bands $d = \left[\frac{3.5}{V_1} \right] \sqrt{P}$	150 kHz to 80 MHz $d = \left[\frac{12}{V_2} \right] \sqrt{P}$	80 MHz to 800 MHz $d = \left[\frac{1.2}{E_1} \right] \sqrt{P}$	800 MHz to 2.5 GHz $d = \left[\frac{2.3}{E_1} \right] \sqrt{P}$
0.01	/	/	0.012	0.023
0.1	/	/	0.038	0.073
1	/	/	0.12	0.23
10	/	/	0.38	0.73
100	/	/	1.2	2.3
For transmitters rated at a maximum output power not listed above the recommended separation distance d in metres (m) can be estimated using the equation applicable to the frequency of the transmitter, where P is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer.				
NOTE 1 An additional factor of 10/3 is used in calculating the recommended separation distance for transmitters in the ISM frequency bands between 150 kHz and 80 MHz and in the frequency range 80 MHz to 2,5 GHz to decrease the likelihood that mobile/portable communications equipment could cause interference if it is inadvertently brought into patient areas.				
NOTE 2 These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.				

Amoul® Ambulanc(Shenzhen)Tech.Co.,Ltd.



Add: 3rd Floor, Block C, Building #5, Skyworth Innovation Industry Park, Tang Tou 1st Road, Shiyan Town, Baoan District, Shenzhen 518108, China

Tel: +86-755 26072210

Fax: +86-755 23016012

Web site: www.ambulgrou.co

深圳市安保科技有限公司 @ambu-lanc.com

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