

NIDEK *Medical*

USER'S GUIDE

Nuvo8

(8 litre)

OXYGEN CONCENTRATOR

[Original language is English]














Danger: Do not smoke when using oxygen or when near this device.

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GLOSSARY OF SYMBOLS

- | | |
|--|--|
|  : ON (power switched on) |  : Do not use oil or grease |
|  : Off (power switched off) |  : Technical information |
|  : Type B device |  : Consult the accompanying documents |
|  : Class II protection |  : Keep in the vertical position |
|  : Do not expose to open flames |  : Fragile - handle with care |
| |  : Oxygen concentration warning light |

GENERAL SAFETY GUIDELINES

Only persons who have read and understood this entire manual should be allowed to operate the *Nuvo (8 litre)*.

USE OF OXYGEN



Oxygen is not a flammable gas, but it accelerates the combustion of materials. To avoid all risks of fire, the *Nuvo (8 litre)* should be kept away from all flames, incandescent sources and sources of heat (cigarettes), as well as any combustible products such as oil, grease, solvents, aerosols, etc.



Place the device in a ventilated area free from smoke and atmospheric pollution (rear filter unobstructed). Do not use in an explosive atmosphere.



The *Nuvo (8 litre)* must not be used for oxygen therapy, it is not intended for medical applications. It is intended for industrial use only.

USE & MAINTENANCE OF THE DEVICE



Do not open the device while in operation: risk of electrical shock.



Use the power cord provided, and check that the electrical characteristics of the power socket used match those indicated on the manufacturer's plate on the rear panel of the machine.



We recommend against the use of extension cords or adapters, as they are potential sources of sparks and fire.

I. DESCRIPTION

The *Nuvo (8 litre)* is intended to supply supplemental oxygen for applications requiring a high oxygen concentration. It is not intended to be used in medical applications. It produces oxygen enriched product by concentrating the oxygen contained in room air.

The *Nuvo (8 litre)* is easy to use.

The single flow adjustment knob allows:

- the device to be easily adjusted to the required flow rate,
- the equipment supplier or operator may limit flows to a specific flow rate with a built-in locking device.

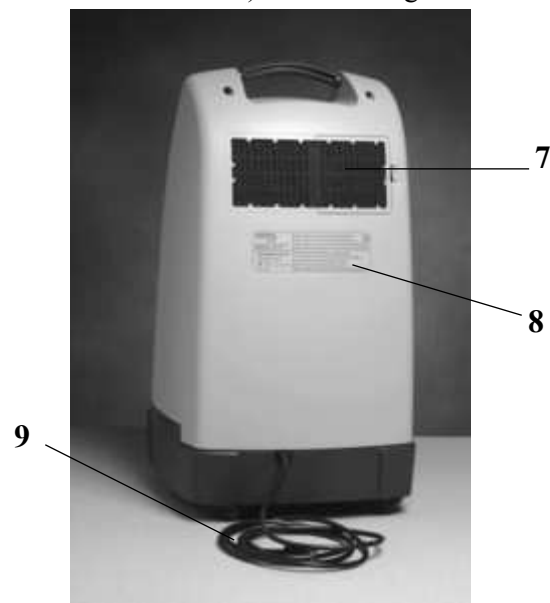
It has a power failure alarm and an operating fault alarm.

Note: the performances described pertain to the use of the *Nuvo (8 litre)* with the accessories recommended by Nidek Medical Products, Inc.



I.1. Front panel (Fig. I.1)

- 1 - (I/O) On/Off Power Switch
- 2 - Humidifier (space reserved)
- 3 - Oxygen enriched air outlet
- 4 - Flow adjustment knob (l/min)
- 5 - Circuit Breaker
- 6 - OCSI (Oxygen Concentration Status Indicator) Indicator Lights or Power On



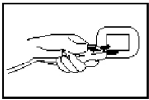
I.2. Rear panel (Fig. I.2)

- 7 - Cabinet Air Filter
- 8 - Manufacturer's Technical Label
- 9 - Power Cord

II. STARTING UP / INSTALLATION

II.1. Use in oxygen generation

- Ensure that the switch (1) is in the **0** (OFF) position.
- Connect the oxygen tube to the concentrator outlet. The tube length for the *Nuvo (8 litre)* should be limited to **20 meters (60 feet) long**.
- Ensure that all of the parts are connected correctly so as to avoid leaks.
- Plug the power cable into a power outlet of the correct voltage and frequency as defined on the manufacturer's technical label (8).



- Press the power switch (**I / 0**) to the ON position (**I**). The green indicator will light when either power is applied or oxygen concentration exceeds the set point if equipped with Oxygen Concentration Status Indicator (OCSI).
- Turn the flow adjustment knob (4) to the required value. If the knob is locked in a specific position, do not force it. **Note:** View the flowmeter in the horizontal plane for accurate settings.

Note: the required oxygen concentration is normally obtained within five minutes after the unit is started.

At the end of the use, press the **I/0** Switch to place it in the **0** (OFF) position to stop the device. The oxygen enriched air flow continues for approximately one minute after the device is stopped.

III. CLEANING - MAINTENANCE

III.1. Cleaning

Only the outside of the *Nuvo (8 litre)* is to be cleaned, with a soft, dry cloth or, if necessary, a damp sponge, then thoroughly dried with wipes and an alcohol based solution. Acetone, solvents or any other inflammable products **must not be used**. Do not use abrasive powders. The removable cabinet air filter (7) must be cleaned in warm water and household detergent weekly or after approximately 100 hours of use. More frequent cleaning is recommended in dusty environments



- Filter / Silencer
- Cabinet Air Filter
- Hour Meter
- Ventilation Grille
- 9V Battery
if equipped

III.3. Maintenance

No special maintenance needs to be carried out by the operator. Your equipment supplier performs periodic maintenance operations to assure continued reliable service from the *Nuvo (8 litre)*.

IV. USEFUL INFORMATION

IV.1. Accessories and spare parts

The accessories used with the *Nuvo (8 litre)* must:

- be oxygen compatible,

IV.2. Materials in direct or indirect contact with the operator

Concentrator casing	Polycarbonate
Mains cable	PVC
Cabinet Air fFilter	Polyester
I/0 (On/Off) switch	Nylon
Casters.....	Nylon
Flow adjustment knob.....	ABS
Gas outlet	Brass
Printed labels.....	Polycarbonate
Pipe/Tubing.....	Aluminium,PVC, polyurethane or silicone
Humidifier	Polypropylene
Filter	Polypropylene

IV.3. Operating principle

The compressor sends filtered ambient air to an electronic valving system, which allows compressed air to pass to the column in production. The columns contain a molecular sieve, whose function is to adsorb the nitrogen and thus allow oxygen to pass.

The oxygen enriched product is then directed to a pressure reducing valve through the adjustable flow meter to the oxygen outlet fitting.

During this time, the column which is being "regenerated" is connected to the ambient air and flow of oxygen enriched product is passed through it (from the column "in production"). In this way, when one column is in production, the other is in a nitrogen desorption or "regeneration" phase. The oxygen enriched product finally passes through a final product filter located prior to the oxygen outlet fitting.

IV.4. Safety devices

- Compressor motor:
Thermal safety is ensured by a thermal switch situated in the stator winding (145 ± 5 °C).
- Ambient air valve:
In the case of a negative pressure in the molecular sieve columns, this valve allows ambient air to enter.

IV.4.1 Safety devices - Continued

- Electrical protection of the *Nuvo (8 litre)*:
A 5A circuit breaker is incorporated into the front cabinet of all 230V models. A 10 A circuit breaker is included with 115V models.

- Safety valve:

This is fitted on the compressor outlet and is calibrated to 3.4 bar (50 psig).

- Class II devices with insulated castings

IV.5. Alarms

- No voltage detection:
In the event of a loss of mains power, a continuous audible alarm is activated and the green light turns off. Test alarm by actuating the **I/O** (On/Off) switch when the power cord is not plugged into the wall receptacle.

IV.5.1 Standard Models (Pressure Alarm) If Equipped

The green indicator light indicates that the unit is turned ON and there is power applied to the unit.

The red indicator light indicates that the system operating pressure is out of range or the input power is not present.

Call the equipment supplier to service the

IV.5.2. OCSI Board Models If Equipped

IV.5.2.1. Operating principle

The Oxygen Monitor (6) is an electronic module capable of checking the effective oxygen concentration supplied by the *Nuvo (8 litre)* concentrator.

The Oxygen Monitor measures the concentration and activates an audible and visual alarm if it falls below the alarm set point percentage.

When the *Nuvo (8 litre)* is started, the indicator lights operate as follows:

IV.5.2.2. Green indicator

The green indicator light indicates that power is applied to the concentrator and that it is ready to provide oxygen enriched air.

IV.5.2.3. Red indicator

The red indicator light is used to warn the operator of a system fault. The low oxygen concentration warning will light when the oxygen concentration set point level is not reached. When the red indicator light is lighted for 15 minutes (± 2 minutes), a continuous audible alarm is activated. Call the equipment supplier to service the device.

IV.5.2.4. Maintenance of the device alarms

- No special maintenance is required. The alarm set-point is factory set and the setting cannot be adjusted. Models operating at 50 Hz are set at 83% and 60 Hz models are set at 85%.

- The equipment supplier checks that the device is still operating correctly when the routine checks are performed on the *Nuvo (8 litre)*.

IV.6. Technical characteristics

Dimensions: L x W x H: 394 x 396 x 706 mm (15.5 x 15.6 x 27.8 in.)

Caster diameter: 38 mm (1.5 in.).

Tilt angle (transport with humidifier fitted): 70°.

Weight: 24 kg /54 lbs

Noise level < 53 dBA

Flow values:

Continuously Adjustable Flowmeter: 2 to 8 liters/minute. (Some models may have other values.)

Accuracy of flow supplied:

The flow supplied is equal to the flow set on the flowmeter, accurate to within $\pm 10\%$ or 200 ml/min, whichever is the larger of the two.

Average oxygen content:

8 l/min: 90%. +5.5% / -3.0%

(Values at 21°C and at one atmosphere pressure).

Minimum recommended flow, 2 lpm.

Maximum recommended flow: 8 l/min.

The variation of the maximum recommended flow does not exceed $\pm 10\%$ of the indicated value when a back pressure of 7 kPa (1 psig) is applied to the output of the device. The maximum outlet pressure is 103 kPa (15 psig).

Electrical power supply:

	<u>115 V Units</u>	<u>230 V Units</u>
Frequency:	60Hz	50/60Hz
Average Power:	585 W	490 W
Protection Class:	Class II	Class II
Mains Protection:	10A	5A

Filters:

At the rear of the device: a cabinet air filter.

At the compressor input: a filter cartridge, behind cabinet air filter.

Before the oxygen outlet: a final product filter < 0.3 μm . (technician only)

Air circulation:

One tubeaxial fan cools the compressor compartment and a second fan cools the heat exchanger coil.

Environmental limit conditions:

The performances of the device (especially the oxygen concentration) are quoted at 21°C (70°F) and one atmosphere. They may change with temperature and altitude. For further information, please consult the maintenance manual.

- The device must be stored, transported and used in the vertical position only.
- Ambient temperature of between 10°C and 40°C (50°F to 105°F) operation.
- Storage temperature from -20°C to 60°C (0°F to 140°F).
- Relative humidity of between 15 % and 95 % operation and storage, both non-condensing.
- Altitude(21°C): Up to 1500 m (5000 ft) without degradation;
Consult your equipment provider for further information regarding 1500 m to 4000 m (5000 to 13000 ft).

IV. 7. Standards

EN 60601-1 [UL60601-1:2003, CAN/CSA-C22.2 No.601.1-M90 w/A1 & A2:
Electrical Safety. EN60601-1-2:2001 Electromagnetic Compatibility

IV.8. Method for disposing of waste

All waste from the *Nuvo (8 litre)* must be disposed of using the methods appropriate to the civil authority of the location where used.

IV.9. Method for disposing of the device

In order to preserve the environment, the concentrator must only be disposed of using the appropriate methods. All materials of construction are recyclable.



Maintenance Items

Cabinet Air Filter: Part Ref: 9250-1025
Replace annually, Clean every week.

Inlet Air Filter: Part Ref: 9250-1028
Replace annually, more often in dusty environment.

Battery, 9 Volt: Part Ref: 7206-0027
Replace annually or sooner if needed.

Nuvo Serial No. _____

Date first used: _____

Maintained by: _____

Your distributor: _____

Address : _____

Telephone : _____

PREVENTIVE MAINTENANCE:

- Wash cabinet filter weekly
- Replace air inlet filter annually
- Check oxygen concentration every 2 years to verify the continuing OCSI function.

The manufacturer’s instructions for the **preventive maintenance** of the devices are defined in the maintenance manual and any updates to it must be followed.

The work must be carried out by suitably trained technicians.

Use original spare parts only (see Pg. 7).

Upon request, the supplier can provide circuit diagrams, spare parts lists, technical details or any other information of use to qualified technical personnel for parts of the device which are designated as being the manufacturer’s responsibility or by the manufacturer as repairable.

IV. 10. Troubleshooting.

Observations	Possible Causes	Solutions
The I-0 (ON/OFF) button is in the " I " (ON) position but the device does not operate.	Power cable (9) is not correctly plugged into the wall outlet.	Check the cable connection.
The audible alarm sounds continuously.	Power failure.	Check the circuit breaker (5) on the front of the unit; Reset if necessary.
Red light remains lighted.	Oxygen concentration is too low.	Contact your equipment supplier.
The alarm test does not work. See IV 4.1.	Faulty 9 Volt battery. Internal electrical fault.	Replace battery. Contact your equipment supplier.
The compressor operates and the I-0 (ON/OFF) button is in the " I " (ON) position but the green indicator is not lighted.	Faulty indicator.	Contact your equipment supplier.
The I-0 (ON/OFF) button is in the " I " (ON) position but there is no flow. The audible alarm sounds continuously.	Pneumatic connection broken or other pressure problem.	Stop the device by pressing the I-0 (ON/OFF) button and contact your equipment supplier.
The I-0 (ON/OFF) button is in the " I " (ON) position, the compressor is operating and there is a flow but the audible alarm sounds continuously.	Internal electrical fault. Pneumatic circuit fault.	Stop the device and contact your equipment supplier.
The compressor stops in mid-cycle, then starts again after a few minutes.	Compressor thermal safety device has been activated. Dirty Filters. Fan is not working.	Stop the device and wait for it to cool down. Clean cabinet filter. Restart. If the device does not start, contact your equipment supplier.
The oxygen enriched air flow is interrupted at the oxygen outlet.	Tube disconnected Tubing is kinked or restricted.	Check that tubing connections are secure. Straighten the tubing; contact your equipment supplier if damaged.



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