

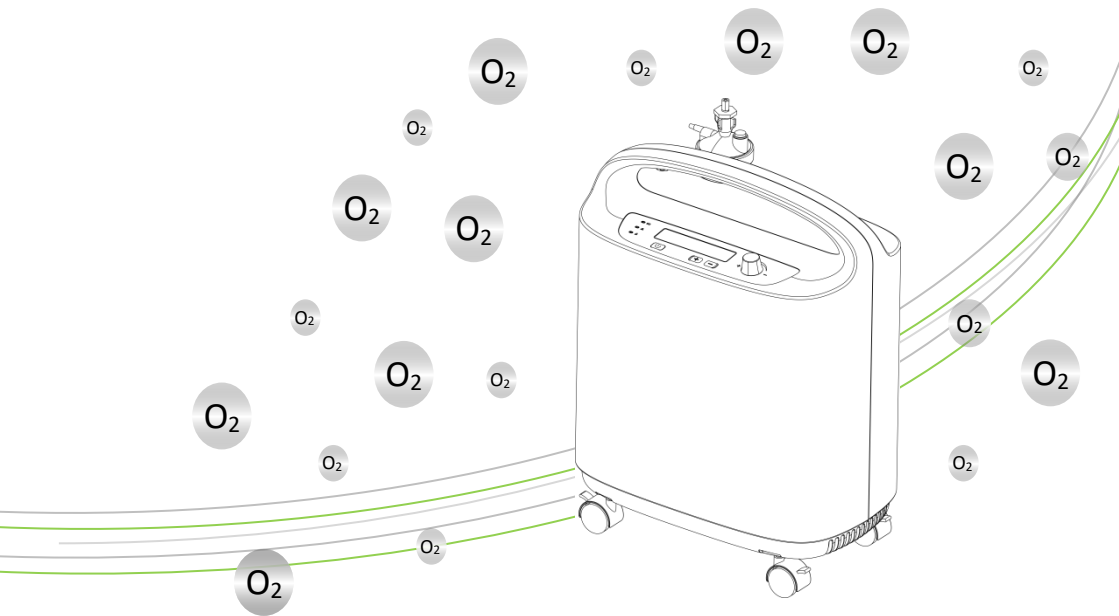


Read this manual carefully before use!

MDA Reg : GB5179223-140100

Oxygen Concentrator

User's Manual



WFR Medical Supplies Sdn Bhd

About this Manual

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WFR Medical Supplies Sdn Bhd

Statement

This manual will help you understand the operation and maintenance of the product better. It is reminded that the product shall be used strictly complying with this manual. User's operation failing to comply with this manual may result in malfunction or accident for which WFR Medical Supplies Sdn Bhd (hereinafter called **WFR**) cannot be held liable.

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

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WFR only considers itself responsible for any effect on safety, reliability and performance of the equipment if: Assembly operations, extensions,

re-adjustments, modifications or repairs are carried out by persons authorized by WFR, and The electrical installation of the relevant room complies with national standards, and The instrument is used in accordance with the instructions for use.

Upon request, WFR may provide, with compensation, necessary circuit diagrams, and other information to help qualified technician to maintain and repair some parts, which WFR may define as user serviceable. Contents of this manual are subject to changes without prior notice.

Conventions

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.

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1 Product Introduction

Oxygen Concentrator is composed of air compressor, air pretreatment, control valve, molecular sieve adsorption tower, control and alarm system, production gas treatment system, oxygen tube, atomization device (optional) and remote controller (optional).

By providing oxygen to patients, with the treatment the oxygen concentrator can help recovery in the following cardiovascular and cerebrovascular, respiratory, chronic obstructive pneumonia and others diseases, and hypoxia. Oxygen concentrator is suitable for different levels of physiological hypoxia crowd such as the elderly, poor physique, pregnant women, college entrance examination students, and it also be used to eliminate fatigue and restore the body function after heavy physical or mental consumption.

Concentrator's safety life is five years.

Contraindications: Oxygen poisoning, oxygen allergy patients are prohibited.

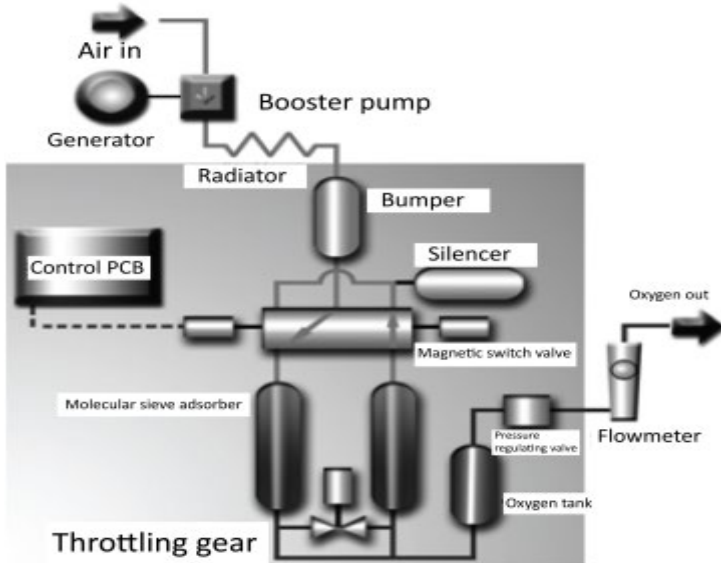
1.1 Application Scope

Oxygen concentrator uses the pressure swing adsorption (PSA) technology and uses the molecular sieve to process air to produce oxygen which concentration within 90% to 96% (V/V). It is intended to supply supplemental oxygen to persons requiring low flow oxygen therapy in medical institutions or at home.

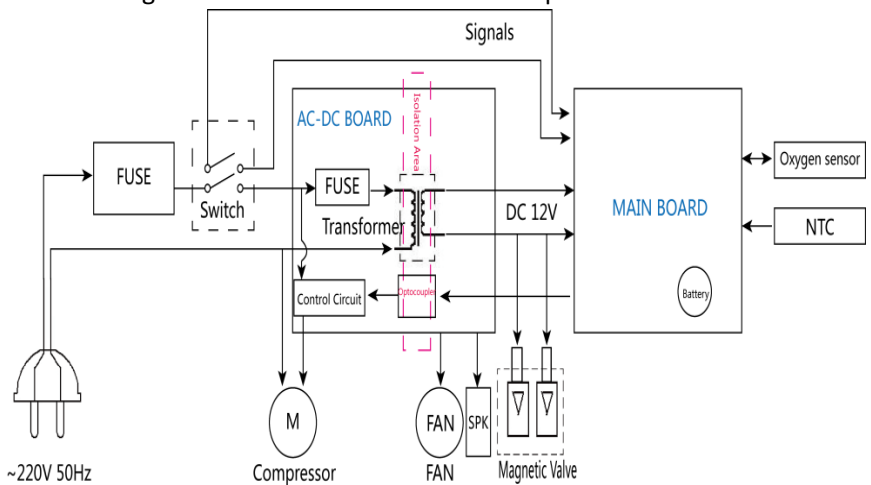
1.2 Operating Principle & Flowcharts

Operating principle: Oxygen concentrator uses the pressure swing adsorption (PSA) technology and through the molecular sieve to process air to produce high medical standard oxygen.

The following figure shows the process:



























The following chart shows the electrical control process:



1.3 Equipment symbols

Some symbols may not appear on your equipment.

Symbol	Description	Symbol	Description
	General warning sign		No open flame: Fire, open ignition source and smoking prohibited
	Caution		No smoking
	Keep dry		Fragile-handle with care
	This side up		Increase or decrease (Knob)
	ON (power)		Class II equipment
	OFF (power)		Alternating current
	Type BF applied part		Date of manufacture
	Refer to instruction manual/booklet		Manufacturer
	Operating instructions		Serial number
	Stand-By		Batch code
P/N	Part Number		Max. Stack Quantity
	Authorized representative in the European community	IP21	Degree of protection provided by enclosure
	The symbol indicates that the device complies with the European Council Directive 93/42/EEC concerning medical devices.		The symbol indicates that the device should be sent to the special agencies according to local regulations for separate collection after its useful life.

2 Safety Guidance



Special Warning

- To prevent oxygen concentrator's possible failures or power shut down, people in urgent need of oxygen and seriously ill patients must prepare other oxygen-supply devices for emergency use (such as oxygen cylinders, oxygen bags).
- The concentrator is suitable for oxygen supplement, and it is not intended to be life supporting or life sustaining.
- This device must be used under the guidance of a physician.
- Personal and family use should be in accordance with the guidance of a physician when the concentration is higher than 93%.



Safety Information

- If any object or liquid enters the unit, disconnect the power plugs immediately, and have them tested by the professional person before re-use.
- Unplug the plug cord from the power outlet if long time no use of concentrator. Do not pull out the power cord when removing the plug.

2.1 Safety tips for oxygen concentrator

WARNING

- Electrical shock hazard, do not disassemble the concentrator. Only a qualified service technician should remove the covers or service the unit.
- Oxygen concentrator cannot be placed and used in the following environment: near heat or bright and dark fire, wet, no shelter, smoke and pollution, too high or too low temperature.
- Do not use the equipment in a confined space or airflow obstruction environment. Oxygen concentrator should be placed in the indoor ventilation, and to avoid direct sunlight. 15cm or more should be left between concentrator and the walls, windows, furniture and other similar objects.
- Ensure there is no humidification devices in the same room or within 2 meters around while using the concentrator.
- After cleaning filter components, they must be totally dried before re-use.

- Do not use the equipment near flammable materials as grease oil, detergent etc. In a certain pressure, oil, grease or grease substances which contacted with oxygen will self-ignition and intense combustion. These substances must be kept away from oxygen concentrator, piping, connectors, and all other oxygen devices. Do not use any lubricant other than the manufacturer's recommendation.
- Do not place debris and water oil containers on the top of the concentrator.
- Do not place any debris place at the bottom of the oxygen concentrator, and it is forbidden to place the concentrator on a soft surface (such as bed or sofa) that can cause tilting or sinking. Do not allow either the air intake or the air outlet vents to become blocked. This can cause the concentrator to overheat and affect performance.
- The equipment has gotten through the electromagnetic compatibility test conducted by testing center for TUV product. The equipment won't produce the harmful RF interference if used in residential area. But in order to keep normal use, please don't use the oxygen concentrator near high frequency disturbing equipment, such as speaker, MRI or CT etc.
- Do not use parts, accessories, or adapters that are not approved by the manufacturer. Using other humidifier or other accessories not approved by manufacturer will reduce the performance of the oxygen concentrator.
- Do not place oxygen concentrator in parallel or in series with other concentrators or oxygen treatment equipment.
- Oxygen therapy is dangerous in some specific environment. The manufacturer recommends that the user consult the physician before using the oxygen concentrator.
- Avoid the production of any spark near the oxygen concentrator, including sparks due to various friction static electricity.
- If the power cord or plug of the oxygen concentrator is damaged, or concentrator does not work properly, or the concentrator was dropped or damaged, please contact the qualified maintenance personnel to check and repair.
- Keep the power cord away from heat or heated surfaces.
- Do not move the oxygen concentrator when charged.
- Do not tread, sit on or lie on the oxygen concentrator.
- Do not drop or insert anything at the concentrator intake or outtake port. If any object or liquid enters the unit, disconnect the power plugs immediately, and have them tested by the professional person before re-use.

- Call the emergency hot line and seek the help of professional health care workers immediately if any discomfort is felt or accident happened while using the concentrator.
 - Turn off the concentrator after use. Unplug the plug cord from the power outlet if long time no use of concentrator. Do not pull out the power cord when removing the plug.
-
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2.2 Electrical Safety Requirement

CAUTION

- The concentrator should be kept away from explosive atmosphere.
 - Oxygen is combustion-supporting gas. No smoking near the working oxygen concentrator. The oxygen concentrator should be kept away from matches, burning cigarettes and other objects of high temperature or fire. Textiles and other normally non-combustible materials are easily ignited and boiled in oxygen-enriched air. Ignorance of this warning may result in serious fire, property damage, and personal injury or death.
 - Turn off the equipment before accessing it for different power outlet.
 - Please pay attention to electricity safety. Do not turn on the concentrator if the plug or power lines damaged. Ensure to cut off the power when cleaning the concentrator or cleaning and replacing the filters.
 - Install the regulator device when the voltage is higher than the normal range or in fluctuation.
 - To extend the life span of the machine, reboot 5 minutes after each shutdown to prevent the compressor to start under pressure.
 - Do not open the cabinet and intake window of concentrator under any conditions.
 - Oxygen concentrators are strictly prohibited for children to avoid accidents.
 - Avoid unattended the concentrator after connected to the power supply.
-
-

2.3 Safety tips for oxygen Inhale

NOTES

- No smoking while using the oxygen concentrator.
- Follow the physician's guidance for it is used for medical treatment.
- Oxygen poisoning, oxygen allergy patients are prohibited.
- The oxygen flow rate shouldn't be too high, or upon the request of the physician. Please contact the supplier or doctor immediately and adjust the flow according to the doctor's instructions if the person or service

person feels that the oxygen content is insufficient; patients with severe lung disease should consult professional physician for flow level.

- Operate the oxygen concentrator in the following environment: working temperature from +5°C to +40°C and relative humidity not higher than 75%.
- Keep the concentrator stable at work and avoid sloping or inverting.
- Do not pump the equipment as oxygen bag when the bottle has water.
- The water in the bottle should not be too much in case of the overflow (please keep the water level between MAX and MIN), and change the water often.
- Different bottles may affect the performance of the oxygen concentrate, please replace the bottle with the original bottle provided or certified by our company.
- Clean and replace the filter sponge in case of the block of the outlet and outlet of oxygen delivery and affect the life of oxygen concentrator.
- In order to keep the concentrator in usual use, please substitute the filter sponge both in outlet and delivery with those provided or certified by our company.
- The atomization device and the nasal cannula as accessories provided by our company is the test sample. The size of the atomization cup is 6-12mL, and the length of the nasal cannula is 1.6m and 6m. Use the nasal cannula personally to keep it clean and health; clean and disinfect it frequently; it is suggested using atomization device and disposal nasal cannula produced by qualified manufacturers.

2.4 Safety tips for atomization

NOTES

- Check the connection of atomization assembly and oxygen concentrator is reliable before using. And check the leakage of atomization assembly, leakage will affect the atomization of the liquid.
- The water in the atomizing cup must be clear, no precipitation and impurities; otherwise the straw and shunt will be blocked.
- The water added in atomizing cup should not exceed 12mL each time.
- To prevent cross infection, it is recommended that each patient use atomization assembly.
- After the atomization assembly is connected, the flow level of the oxygen generator should be adjusted to the minimum.
- Different atomization assembly may affect the atomization effect; please use the original atomization assembly provided or certified atomization assembly by our company.

3 Installation and operation

3.1 Open-case inspection

NOTE:

- **Unless the oxygen machine is used immediately, the machine must retain the carton and store the packaging material before use.**

Firstly check the carton or other packaging is obvious damage. If any damage is detected, contact the carrier or us. Take out all bulk packaging from the carton. Carefully take out all components from the carton. Check whether there is any damage to concentrator surface such as notches, dents, scratches and so on. Check all components. Check whether the components are missing according to packing list.

3.2 Storage and transportation

Do not place any objects on the top of the oxygen concentrator.

The unit should be stored in the environment without corrosive air and with good ventilation.

Be careful to transport or convey, don't let it reversal or thwart, tilt angle not greater than 5°.

NOTE:

- **When the storage temperature is below 5°C, it can't work at once. Please place the machine in a normal working temperature environment for four hours before using.**

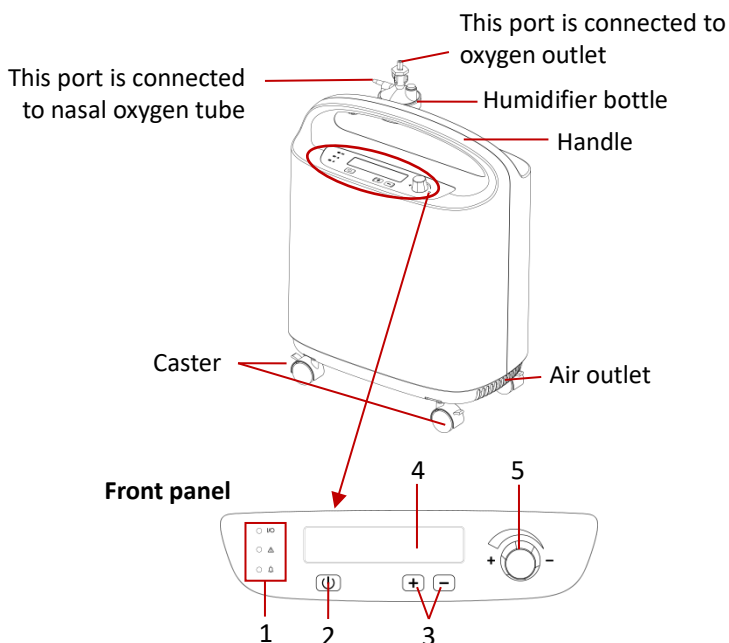
3.3 Installation

1. Open the package carton, take out the oxygen generator main unit and all accessories, and check the accessories against the packing list.
2. Put the oxygen concentrator in a convenient and safe place where there is air flow.
3. Take out the humidifier bottle, remove the top cover, and pour purified water (or distilled water) into bottle, ensure that the water level is between "Max" and "Min", and then cover the top cover.
4. Place the humidifier bottle to the fixing socket and fix it with the elastic rope.

5. Connect the humidification bottle to the oxygen outlet of the concentrator using a connecting tube, and the other port of the humidification bottle to the nasal oxygen tube.
6. Plug the power supply cord into a socket that meets the requirements.

3.4 Parts and function introduction

Main unit



1. Indicator LED


- ✧ ○ I/O: Power indicator
 - ◆ This indicator lights green when the oxygen concentrator is connected to the main power supply.
- ✧ ○ ▲: Air pressure/concentration/Temperature/Flow adjustment failed indicator
 - ◆ The indicator lights yellow if the system air pressure is higher than 260kPa or lower than 20kPa. And the screen shows the corresponding error code.
 - ◆ When the oxygen concentration is lower than 82%, the indicator lights up in yellow.
 - ◆ When the temperature of the system exceeds the maximum

allowable temperature limit (65°C), the oxygen generator stops working. The indicator lights yellow and the screen show the corresponding error code.

- ◆ The flow meter or the gas path is blocked and the flow adjustment fails. The indicator lights yellow and the screen show the corresponding error code.

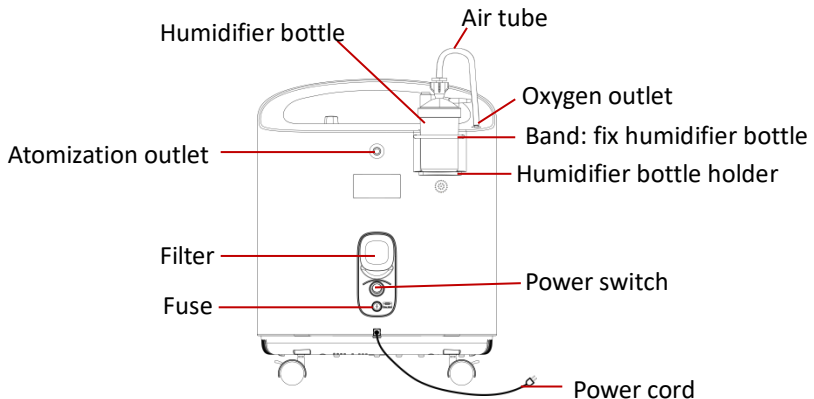
✧ ○ 🔔: power failure alarm indicator

- ◆ Accidental power off happened while operating the concentrator, this indicator lights red and flashes with buzzer alarm tone. This can prompt the user to disconnect the power and check the power supply system.

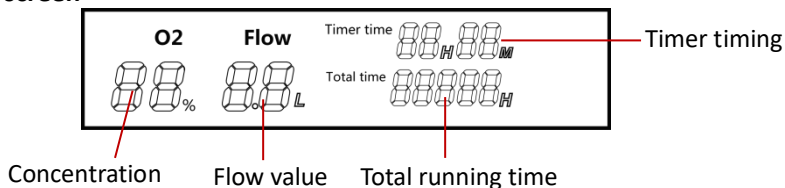
2.  Start/Stop oxygen button
3. Timer timing: increase, decrease button
 - ◆ Adjust the timing, increase the value or decrease the value.
4. Display screen
5. Flow knob: adjusts the flow; rotates to the left to increase the flow, and rotates to the right to decrease the flow.

NOTE:

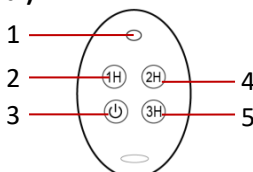
- The temperature near the air outlet will be higher while the concentrator is operating, do not close to the air outlet to avoid being burned.



Display screen



Remote controller (optional)




1. Working indicator (the indicator lights green when using buttons of remote controller)
2. Timing 1 hour button
3. Start/Stop oxygen button
4. Timing 2 hours button
5. Timing 3 hours button

Main structure and material of concentrator


Main Structure	Material	Description
Air compressor	ZL102 cast alum, filling PTFE	Provides the air pressure necessary for adsorption and used to separate oxygen from air
Air pretreatment	Foam filter, ABS resin, nonwovens	Used to provide gas cooling, water removal, filtration, etc.
Control valve	/	Control the compressed air treated by the air pretreatment system into the molecular sieve adsorption tower for periodic pressurization and exhaust
Molecular sieve adsorption tower	6063 aluminum alloy, molecular sieve	The molecular sieve is filled in a closed container. Oxygen in the air is separated by the characteristic of selective adsorption of gas by a molecular sieve.

Control and alarm system	PCB, silicon components	Automatic control and fault alarm according to preset working procedures
Producing gas treatment system	ABS resin, Polypropylene	Collecting, filtering, regulating and humidifying the oxygen generated by the oxygen concentrator.

3.5 Power ON/OFF

Power On: Press the I/O power switch on the back of concentrator to position “I” (ON). The oxygen concentrator is in working state. Then press the button  on front panel to start oxygen.

In the three seconds before oxygen concentrator restarts, the system will be automatically on self-check during which time the buzz and LCD without light belongs to normal situation. Oxygen concentration can reach a stable status after running about 12 minutes of concentrator.

Power off: Press the button  on front panel to stop the oxygen supply during operation. After use, touch the **ON/STANDBY** button to stop oxygen supply and disconnect the tube or connecting pipeline from the oxygen outlet, then press the I/O power switch to position “O” (OFF). Unplug the power cord from the outlet socket.

WARNING

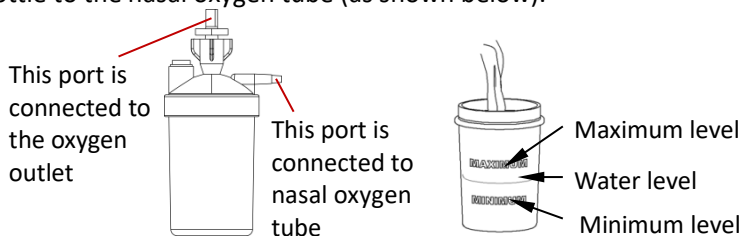
- **Do not turn on and off the oxygen concentrator frequently. The time interval of shutting down and restart should be more than 5 minutes (that is, the gas must be discharged to prevent the air compressor with pressure to start and affect its life).**


3.6 Oxygen uptake operation

Put the oxygen concentrator in a convenient and safe place where there is air flow and make sure its back case is at least 15cm away from the wall, window or any other things that are obstructing the airflow.

1. Check the concentrator has been connected with power supply and make sure it in power off status.
2. Remove the top cover part of humidification bottle and fill pure water (or distilled water), make sure the water level is between the “MAX” and “MIN” mark of the bottle and then cover the top part.

3. Install the humidification bottle on the humidifier bottle holder of concentrator and secure it with band.
4. Press the power switch to position "I" (ON). The power is plug in when the power indicator turns green. The oxygen concentrator is in working state.
5. Connect the humidification bottle to the oxygen outlet using a connecting tube and connect the other part of the humidification bottle to the nasal oxygen tube (as shown below).





6. Wear a nasal oxygen tube.
7. Press the button  on the front panel to start oxygen supply.
8. Adjust the nasal cannula to appropriate position for easy inhale of the pure oxygen and get maximum comfort. The oxygen density could be reached to 90% within 12 minutes.
9. Turn off the equipment after use. Pull out the power pin and take care of the nasal cannula for another use.

Every few seconds the concentrator issues "TAPOO" sound while operating, it is the normal ventilation sound.

WARNING

- Choose safety-qualified socket and socket board with safety electrical certification.
- Do not remove the cabinet unless qualified technician, in case of damaging the machine, electric shock or other accident.
- Oxygen uptake time and oxygen flow adjustment should follow the physician's advice.
- Check that the tubing or accessory is clogged, kinked or the humidifier is damaged if the flow value is lower than 0.5L/min.
- If no use of concentrator for a long-term, the water in humidifier bottle should be drained. Save the humidifier bottle after cleaned and dried.

3.7 Optional operation - atomization (not administered)

1. Press the power switch to position "I" (ON) to turn on the concentrator.
2. Connect the atomized mask or mouthpiece to the medicine cup.
3. Unscrew the nut of the oxygen atomizer outlet; connect the atomization tubing to the outlet.
4. The press the button  on the front panel, and using knob to adjust the flow to minimum.
5. Put the atomization mouthpiece into the mouth or wear the mask and start the atomization therapy (follow the doctor's instructions for the atomization time).
6. After the atomization is finished, press the button  to stop atomizing. Remove tubing and turn off the oxygen concentrator by pressing the I/O power switch.

Atomization performance

The atomization outlet pressure is 60kPa to 250kPa, and the maximum air flow rate is ≥ 3 L/min.

The atomization rate of the atomization assembly is ≥ 0.2 mL/min.



WARNING

- **Oxygen uptake and atomization cannot be used at the same time.**
 - **Adjust the flow rate to minimum value when using the atomization function.**
-

3.8 Other operations

3.8.1 Timing operation

During working the concentrator can be set timer length by using timer function.

1. Press the I/O power switch to position "I" (ON), and then press the button  to start the oxygen supply.
2. Press button, **Timing (+, -)** on front panel to set timer timing.
3. Using **Increase (+)** button to adjust the timing hours (maximum is 10 hours).
4. Then press button  to confirm the setting.

When the shut hour is set, the system comes into count down time and the

oxygen concentrator LCD will show the remaining time. When remaining time becomes 0, the oxygen concentrator will go to standby status.



3.8.2 Adjust flow

Rotate the knob on the front panel to adjust the flow. Rotate the knob to the left to increase the flow and to the right to decrease the flow.

The greater the flow value, the greater the air flow, oxygen purity will be reduced.

For KSW-3 oxygen concentrator, the recommended maximum flow rate is 3L/min; the recommended maximum concentration is 90%-96%.

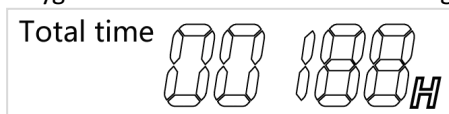
For KSW-5 oxygen concentrator, the recommended maximum flow rate is 5L/min; the recommended maximum concentration is 90%-96%.

3.8.3 Anion function

1. Press the anion key (O_2^-), then the icon lights on. It indicates that the anion function is turned on.
2. Press the anion key (O_2^-) again to turn off the anion function. And the icon off.


3.8.4 View the total running time


The total running time is the sum of the working hours of the oxygen concentrator starting from the first use. As shown in the figure below, indicating that the oxygen concentrator has been working for 188 hours.



3.8.5 Optional operation – using remote controller

The function of buttons on the remote controller is the same with some keys on the concentrator display panel. Refer to the previous chapter description for the details of buttons function.

Press  on the remote controller when the concentrator power is on and in standby status.

Press  while the concentrator operating to stop the oxygen supply.

Press timer button on the remote controller to set timer length. When the remote controller cannot work, the battery may not have sufficient power. Please replace the battery periodically with the same battery and be careful of the affirmative and negative pole.

NOTE:

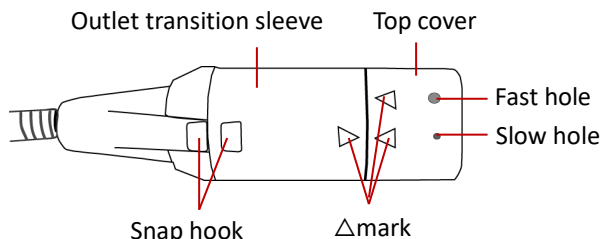
- The concentrator should be in the remote range when using the controller.
- The maximum remote control distance is 50m.
- Please take the batteries out of the controller if unused for a long time.

3.9 Usage and cleaning of Headset

Headset can be worn on head, it makes user comfortable with its excellent personal feeling. Unique perfuming function: add different essential oil into liquid cup, this aromatherapy can be combined with oxygen at the same time.

Usage of Headset

1. Adjust the flow rate of headset.
Headset has two levels flow rate: fast and slow. The adjustment method is shown below. Turn the top cover of Headset and make the "△" mark alignment. "Click" sound will be heard while rotating the headset.

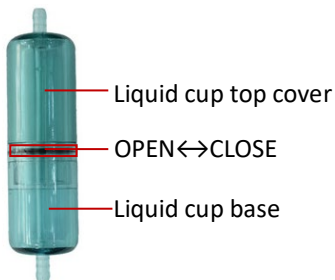


2. Wear the Headset according to the below figure shown during oxygen inhalation.



Usage of liquid cup

Add aromatic oil: as shown below, turn the top cover according to the arrow "OPEN↔CLOSE" to open the cup, add the proper amount of aromatic oil, and then cover the top cover to the CLOSE position. Install the liquid cup correctly and then you can turn on the concentrator.



Cleaning

Rinse or immerse the disassembling liquid cup in warm water for about 15 minutes. Add appropriate amount of vinegar in the water for cleaning more hygienic. Clean the liquid cup with diluted cleaning agent, and then wash it by water.

Do not wash the above components with boiled water to prevent heat distortion.

All components must be dried and stored after cleaning.

Use clean soft cloth dipped in medical alcohol to wipe the Headset outlet.

4 Troubleshooting

4.1 Oxygen Concentrator Alarm and Indicator System

Alarm system design aims at monitoring the working oxygen concentrator in case of such situations as power off, abnormal pressure or indicator of running condition of the equipment. **All alarms of this equipment are technical alarms.**

It includes an acoustic alarm system and a visual alarm system.

The list of alarm messages is as follows:

Alarm	Alarm reason	Audible	Visual	Priority	Measure
Power off	The network power is disconnected during operation	Triple + double + triple + double beep	The indicator quickly flashes red, frequency: 1.4~2.8Hz	High	Turn off the power immediately. If an alarm still exists after confirming that the power supply and connection are normal, please turn off the oxygen concentrator and contact local dealer or manufacturer.
Low concentration	Oxygen concentration is lower than 82%	Single beep	The indicator lights yellow	Low	Contact your local distributor or manufacturer. Spare oxygen should be prepared for those who are in urgent need of oxygen.
Abnormal air pressure	The internal pressure of the oxygen concentrator is higher than 260kPa or lower than 20kPa	Single beep	The indicator lights yellow and the screen displays code "E05" if the air pressure is high.	Low	Turn off the power immediately. Check and make sure the cleanness of outlet and inlet of air without any blocks. And then restart the equipment, please inform the distributor or manufacturer and shut down the concentrator if the alarm is still on.
			The indicator lights yellow and	Low	

			the screen displays code "E02" if the air pressure is low.		
High temperature	The oxygen concentrator system temperature is higher than 65°C.	Single beep	The indicator lights yellow and the screen displays code "E35".	Low	Turn off the power immediately. .Check and make sure the cleanness of outlet and inlet of air without any blocks. And then restart the equipment, please inform the distributor or manufacturer and shut down the concentrator if the alarm is still on.
Oxygen sensor communication failure	The oxygen concentrator did not receive communication from the oxygen sensor.	Single beep	The indicator lights yellow and the screen displays code "E31".	Low	Contact your local distributor or manufacturer. Spare oxygen should be prepared for those who are in urgent need of oxygen.
Low Voltage	The supply voltage of the concentrator is 85% lower than the standard voltage.	Single beep	The indicator lights yellow and the screen displays code "E03".	Low	Turn off the concentrator immediately, and restart it after confirming that the voltage of the network power supply is normal.

4.2 Fault list

Symptoms	Possible Causes	Solutions
After turned on the switch, the light, alarm system and oxygen concentrator don't work.	<ol style="list-style-type: none"> 1. The plug doesn't insert the switch firm. 2. No power. 3. Fuse is broken. 	<ol style="list-style-type: none"> 1. Insert the plug to the socket correctly. 2. Check the power supply. 3. Replace the fuse.

<p>After turned on the switch, the light works, but the oxygen concentrator doesn't work.</p>	<ol style="list-style-type: none"> 1. Air compressor protection. 2. Inlet or outlet jammed. 3. Ambient temperature is lower than 5°C 	<ol style="list-style-type: none"> 1. If oxygen concentrator shutdown after restarting of 45 minutes, please contact the vendor. 2. Clean the filter. Check if anything jammed intake. Check if objects blocking the cooling. 3. Rise the ambient temperature.
<p>Cannot obtain the requested current capacity.</p>	<ol style="list-style-type: none"> 1. Nasal oxygen tube is blocked or damaged. 2. Mask jammed or damaged 3. Humidifier bottle is blocked or damaged. 4. Oxygen tube surpasses the stipulation or has the bend. 	<ol style="list-style-type: none"> 1. If the flow is normal, take down the nasal tube, clean, correct the dead bend or replace it. 2. If the flow is normal, take down the humidifier bottle, clean or replace it.
<p>Atomization amount is insufficient or cannot be atomized while using the atomization</p>	<ol style="list-style-type: none"> 1. The atomizing assembly installed improperly or incorrectly; 2. The atomizing assembly outlet is blocked; 	<ol style="list-style-type: none"> 1. Install the assembly properly and correctly 2. Replace the atomizing assembly <p>If this condition still exits, stop using the atomization assembly and contact the supplier immediately.</p>
<p>Remote controller cannot work.</p>	<ol style="list-style-type: none"> 1. The concentrator is out of the remote range. 2. Lower battery capacity or no power. 	<ol style="list-style-type: none"> 1. Using remote controller within the remote range. 2. Replace battery

4.3 Fault code

The description of fault code displayed on concentrator is as follows:

Code	Fault Description
E02	The pressure suddenly drops below the limit pressure (20kPa) during operation
E03	The supply voltage of the concentrator is lower than 85% of the standard voltage
E04	The flow meter or the gas path is blocked and the flow adjustment fails during operation
E05	The pressure exceeds the limit pressure (260kPa) during operation
E31	Cannot receive data from oxygen sensor
E35	The temperature detected by the temperature sensor exceeds the allowed range

If it's not in the above cases and there is still no oxygen output, please contact the distributor or the manufacturer.

Non-professional maintenance personnel or personnel without our authorization are strictly prohibited to open the concentrator cabinet for maintenance. If necessary, **WFR** may provide the circuit diagram, list of components of concentrator, the calibration rules or other required materials that help the qualified technicians who assist the user to repair the equipment.

5 Care and Cleaning

Only the dealer or a trained person authorized by the manufacturer can perform pre-maintenance or performance commissioning of the oxygen concentrator.

Manufacturers recommend that the oxygen concentrator's running time is not less than 30 minutes each time. Do not turn on or off the oxygen concentrator frequently. Turn on the concentrator at least after 5 minutes after turning off to protect the compressor's life.

The replacement period is not fixed since the molecular sieve is greatly affected by the environment (temperature, humidity). The replacement period is mainly based on concentration change. If the concentration falls below 82% mentioned in ISO 8539, it can be understood that the oxygen concentration is unqualified, and the molecular sieve should be replaced.

WARNING

- **Disconnect the equipment from the power supply before performing maintenance to avoid electric shock. Person without training or authorization of manufacturer cannot open the cabinet.**
-

5.1 Care and Cleaning of cabinet

It's helpful for normal use to keep the oxygen concentration clean for long. The outside of the cabinet is cleaned at least once a month. Disconnect the equipment from the power supply before cleaning.

Concentrator cabinet cannot be washed with water; you can wipe its surface with a clean soft cotton or sponge. Do not pore the liquid into the cabinet gap.

A mild home neutral detergent can be used to wipe the cabinet.

5.2 Care and Cleaning of humidifier bottle

Replace the water in bottle every day.

Use clean water to clean the humidifier bottle. If there is any besmirch, you can use warm neutral detergent or solution of white vinegar and hot water with proportion of 1:10 to wash it. Clean the bottle with hot water, and then fill it with distilled water within the specified water level before using.

WARNING

- **Empty the humidifier each time after using the equipment.**
-
-

5.3 Clean or replace filter sponge

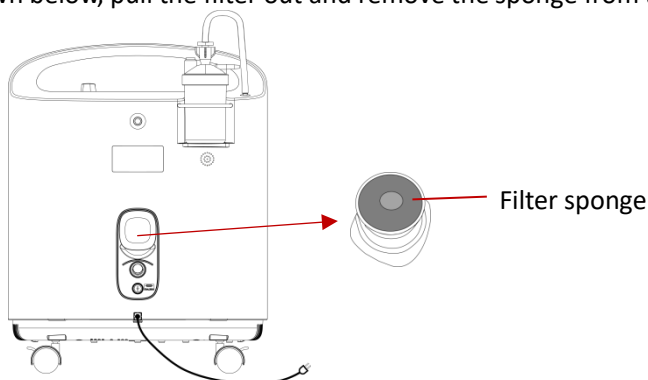
The cleaning and replacement of the filter sponge is important to protect and extend the service life of the compressor and molecular sieve of the concentrator. Please clean or replace it in time. It is advice that you should clean or replace the filter sponge after each 100 hours.

WARNING

- **Do not operate oxygen concentrator without filter sponge installation or with wet sponge. Otherwise it will damage the oxygen concentrator.**
-
-

Disassembly

The filter sponge is located on the back of the oxygen concentrator, as shown below, pull the filter out and remove the sponge from the filter.



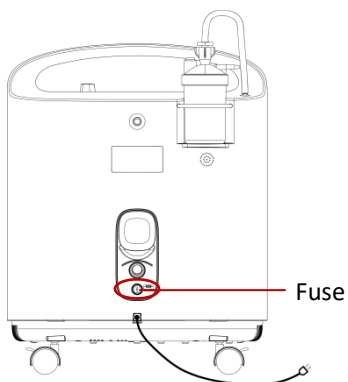
According to the actual use of time and environmental effect to determine the actual cleaning time of filter sponge.

Cleaning

Clean the sponge with a diluted detergent and wash it with water. The sponge must be completely dry before it can be installed on the filter. Recommended cleaning agents are: household neutral detergent or vinegar solution (1 V vinegar with 10 V water)

5.4 Overload protection

When you suspect or determine the overload protection (turn on the main unit when the power connection is normal, a power failure alarm occurs), you can use the tool to remove the screw and replace the fuse before restarting the concentrator.



5.5 Disposal of waste

Dispose of the waste disposable nasal cannula, filter sponges, felts, atomization assembly and oxygen concentrator should follow local laws and regulations in case of environmental pollution.

6 Accessories

You can order accessories from WFR supplies at www.wfr.com or consult your local WFR representative for details.

WARNING

- Disposable accessories are designed for single-patient use only. Reuse of them may cause a risk of contamination and affect the measurement accuracy
 - Use only WFR-approved accessories or listed in this chapter. Or else, the performance and electric shock protection cannot be guaranteed, and the patient may be injured.
 - Check the accessories and their packages for any sign of damage. Do not use them if any damage is detected.
 - The accessory material that contacts the user or other personnel has undertaken the bio-compatibility test and is verified to be in compliance with ISO 10993-1.
-

List of accessories

No.	Name	Specification	Unit	Qty	Remarks
1	Humidifier bottle	/	pcs	1	/
2	Nasal cannula	1.6 meter	pcs	1	Sample
3	Nasal cannula	6 meter	pcs	1	Sample
4	Sponge	/	pcs	1	/
5	Atomization assembly	/	set	1	Optional
6	Remote controller	/	pcs	1	Optional

7 Product specification

7.1 Main unit

Electrical Safety classification	Class II, BF type applied part; non AP/APG equipment
Liquid protection level	IP21
Operating mode	Continuous
Atomizing port pressure range of concentrator with atomizing	60kPa - 250kPa
Oxygen outlet pressure	30kPa -80kPa
Fuse	F5AL250V
Power supply	AC 110 V, 60Hz; AC 220 V, 50Hz;AC 220 V, 60Hz; AC 230 V, 50Hz; AC 240 V, 50Hz

7.2 Environmental Specifications

Operating environment	Temperature: 5°C - 40°C
	Relative humidity: ≤75%
	Barometric pressure: 86kPa - 106kPa
Storage and transportation environment	Temperature: -40°C- +55°C
	Relative humidity: ≤93%
	Barometric pressure: 50kPa - 106kPa

7.3 Concentrator models and Technical parameters

Below table shows concentrator models and main technical parameters.

Type	Rated flow (L/min)	Concentration (V/V)	Noise (dBA)	Size (mm) (LxWxH) ±20mm	Power consumption (VA)	Weight (kg) ±1kg
KSW-3	3	93%±3%	≤53	410X280X510	≤320	18
KSW-5	5		≤54		≤480	

The effect of altitude on oxygen concentration delivered by oxygen concentrator:

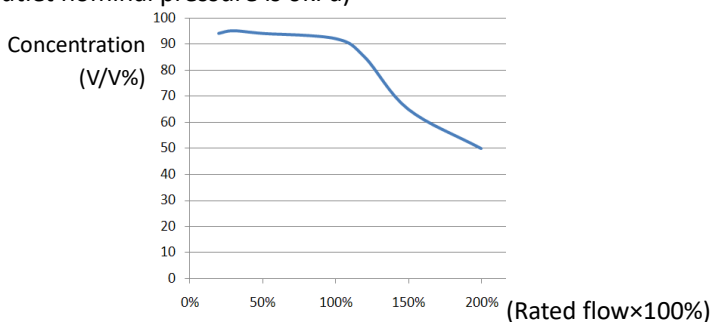
Altitude(m)	≤800	800 - 1500	1500 - 3000	3000- 4000
KSW-3	≥90%	≥82%	≥75%	≥65%
KSW-5	≥90%	≥80%	≥72%	≥63%

Impact of outlet pressure on output flow:

When the outlet nominal pressure is 0kPa, the specified control flow value for KSW-3 concentrator is 3L/min; Output oxygen concentration range for KSW-5 concentrator is 5L/min.

When the outlet nominal pressure is 7kPa, the specified control flow value for KSW-3 concentrator is 2.8L/min; Output oxygen concentration range for KSW-5 concentrator is 4.5L/min.

Function between Oxygen concentration of concentrator and rated flow (outlet nominal pressure is 0kPa)



Applicable condition for the indicator of oxygen concentrator:

- Temperature: 5- 40°C
- Relative humidity: ≤80%
- Barometric pressure: 86kPa - 106kPa

8 Warranty and Service

8.1 Warranty

The manufacture date of can be found on the nameplate or label.

THIS WARRANTY IS EXCLUSIVE AND IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING WARRANTIES OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE. All faulty components can free repair or replace during the warranty period.

In the normal condition of usual use and storage, the company is responsible for free repair and replacement if the concentrator cannot be used within a week after sold (within 12 month of commercial storage). The user can take the oxygen concentrator to the company following service department or agency or distributor for free repair with the invoice and warranty card if the equipment cannot be used within 12 month after sold. More than 12 month, the company provides the parts to repair with reasonable charge if it could not be used.

The following conditions are not covered by the warranty:

- ◆ Damage or deformation of the concentrator caused by collision;
- ◆ Water into the unit or unit get wet;
- ◆ The concentrator cannot work properly because of self-disassemble caused by user.
- ◆ Assembly is removable, stretching and re-commissioning;
- ◆ Equipment repair or alterations by non-authorized personnel of WFR;
- ◆ Damage caused by non-normal use beyond the prescribed conditions;
- ◆ Original serial number tag or manufacturer logo is removed or replaced;
- ◆ Improper use of the product.

If you have any questions, please contact us.

NOTES:

- **Please take care of the purchase invoice and maintenance card for service.**
- **The non-controllable factor or the artificial damage is not applicable to maintenance scope.**
- **The service term is subject to WFR only.**
- **Figures in this manual are for reference only. Please take the real product you receive as standard. No notice will be made in case of any update.**

8.2 Contact information

If any questions in equipment operation, please contact the manufacturer or local agency.

WFR Medical Supplies Sdn Bhd
E-30-3 Lorong Bayan Indah 2,
11900 Bayan Lepas, Pulau Pinang, Malaysia
Tel : +604-618 0809

9 EMC

This product has passed the electromagnetic compatibility test conducted by testing center. Please install and use this product according to the following electromagnetic compatibility information. Portable and mobile radio frequency communication equipment may affect the medical electrical equipment. Do not use this product near the places with strong electromagnetic interference sources, such as walkie-talkies, CT, MRI and other equipment.

The oxygen concentration of concentrator is $93\pm 3\%$ when conducting EMC test.

This product uses the ordinary power line RVV 2x0.75, its maximum length is 2 meters.

WARNING

- **Use of cables and transducers other than those specified, with the exception of cables and transducers sold by the manufacturer of the medical electrical equipment as replacement parts for internal components, may result in increased emissions of decreased immunity of the oxygen Concentrator.**
 - **The oxygen Concentrator should not be used adjacent to or stacked with other equipment. If adjacent or stacked use is unavoidable, the device should be observed to verify normal operation.**
-

9.1 Electromagnetic emissions

The oxygen concentrator is intended for use in the electromagnetic environment specified below. The customer or the user of the concentrator should assure that it is used in such an environment. As following:

Emission test	Compliance	Electromagnetic environment
RF emissions CISPR 11	Group 1	The oxygen concentrator uses RF energy only for its internal functions. Therefore, its RF emissions are very low and are not likely to cause any interference in nearby electronic equipment.
RF emissions CISPR 11	Class B	The oxygen concentrator is suitable for use in all establishments, including domestic establishments and those directly connected to the public
Harmonic emissions IEC 61000-3-2	Class A	

Voltage fluctuations/ flicker emissions IEC 61000-3-3	Compliance	low-voltage power supply network that supplies buildings used for domestic purposes.
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9.2 Electromagnetic immunity

The oxygen concentrator is intended for use in the electromagnetic environment specified below. The customer or the user of the concentrator should assure that it is used in such an environment. As following:


Immunity test	IEC60601 Test level	Compliance level	Electromagnetic environment
Electrostatic discharge (ESD) IEC 61000-4-2	$\pm 6\text{kV}$ contact $\pm 8\text{kV}$ air	$\pm 6\text{kV}$ contact $\pm 8\text{kV}$ air	Floors should be wood, concrete or ceramic tile. If floor are covered with synthetic material, the relative humidity should be at least 30%.
Electrical fast transient/burst IEC 61000-4-4	$\pm 2\text{kV}$ for power supply lines $\pm 1\text{ kV}$ for input/output lines	$\pm 2\text{kV}$ for power supply lines Not applied	Mains power quality should be that of a typical commercial or hospital environment.
Surge IEC 61000-4-5	$\pm 1\text{kV}$ for line to line $\pm 2\text{kV}$ for line to ground	$\pm 1\text{kV}$ for line to line Not applied	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 IEC 61000-4-11	$<5\% U_T$, for 0.5 cycles (95% dip in U_T) $<40\% U_T$, for 5 cycle (60% dip in U_T) $<70\% U_T$, for 25 cycle (30% dip in U_T) $<5\% U_T$, for 5s	$<5\% U_T$, for 0.5 cycle (95% dip in U_T) $<40\% U_T$, for 5 cycle (60% dip in U_T) $<70\% U_T$, for 25 cycle (30% dip in U_T) $<5\% U_T$, for 5s	Mains power quality should be that of a typical commercial or hospital environment. If the user of the measuring system requires continued operation during power mains

	(95% dip in U_T)	(95% dip in U_T)	interruptions, it is recommended that the measuring system be powered from an uninterruptible power supply or a battery.
Power frequency magnetic field 50Hz IEC 61000-4-8	3A/m	3A/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 AC mains voltage prior to application of the test level.			

9.3 Electromagnetic immunity

The oxygen concentrator is intended for use in the electromagnetic environment specified below. The customer or the user of the concentrator should assure that it is used in such an environment. As following:

Immunity test	IEC60601 Test level	Compliance level	Electromagnetic environment—guidance
Conducted RF IEC 61000-4-6	3V effective value 150kHz - 80MHz	3V effective value	Portable and mobile RF communications equipment should be used no closer to any part of the oxygen concentrator including cables, than the recommended separation distance calculated from the equation applicable to the frequency of the transmitter. Recommended Separation Distances $d = 1.2 \sqrt{P}$ $d = 1.2 \sqrt{P}$ 80MHz - 800MHz $d = 2.3 \sqrt{P}$ 800MHz - 2.5GHz Where:
Radiated RF IEC 61000-4-3	3V/m 80MHz - 2.5GHz	3V/m	

			<p>P is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer and</p> <p>d is the recommended separation distance in meters (m). 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. Interference may occur in the vicinity of equipment marked with the following symbol: </p>
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Note 1: From 80MHz to 800MHz, the higher frequency range applies.

Note 2: These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.

^a 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 oxygen concentrator is used exceeds the applicable RF compliance level above, the oxygen concentrator should be observed to verify normal operation. If abnormal performance is observed, additional measures may be necessary, such as re-orienting or relocating the oxygen concentrator.

^b Over the frequency range 150kHz to 80MHz, field strengths should be less than 3V/m.

9.4 Recommended separation distances between portable and mobile RF communications equipment and the concentrator

The oxygen concentrator is intended for use in the electromagnetic environment specified below. The customer or the user of the concentrator can help prevent electromagnetic interference by maintaining a minimum

distance between portable and mobile RF communications equipment (transmitters) and the concentrator as recommended below, according to the maximum output power of the communications equipment.

Output power of transmitter in Watt (W)	Separation distance according to frequency of transmitter(m)		
	150kHz - 80MHz $d=1.2 \sqrt{P}$	80MHz - 800MHz $d=1.2 \sqrt{P}$	800MHz - 2.5GHz $d=2.3 \sqrt{P}$
0.01	0.12	0.12	0.23
0.1	0.38	0.38	0.73
1	1.2	1.2	2.3
10	3.8	3.8	7.3
100	12	12	23

For transmitters rated at a maximum output power not listed above, the recommended separation distance d in meters (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: From 80MHz to 800MHz, the higher frequency range applies.

Note 2: These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.

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