

Cirrus 5 Oxygen Concentrator Manual



Important: Make sure you read and understand all of the information

contained in this manual before operating your oxygen concentrator!

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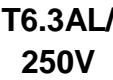




1 Introduction

Thank you for purchasing the Cirrus 5 Oxygen Concentrator. This user manual contains function, operation steps, basic trouble shooting and important safety information.

To ensure your safety and proper operation of this oxygen concentrator, please carefully read this user manual before use.

2 Symbols

The following table is a list of symbols and definitions regarding the Oxygen Concentrator.

Symbol	Description	Symbol	Description
	Warning – Describes a hazard or unsafe practice that can result in severe bodily injury or death		Indicating its conformity with the Medical Devices Directive 93/42/EEC. The 0197 is the number of the Notified Body.
	Caution – Describes a hazard or unsafe practice that can result in property damage		“ON” (power)
	Follow User's Manual		“OFF” (power)
	CLASS II equipment		Serial number
	Authorized Representative in the European Community		Separate collection for electrical and electronic equipment
	Type B Applied Part, The applied part complying with the specified requirements of standard IEC/EN 60601-1 to provide protection against electric shock, particularly regarding allowable patient leakage current		Variability, rotational adjustment. To identify the control by means of which a quantity is controlled. The controlled quantity increases/decreases by rotation with the figure width.
	Date of manufacture		Alternating current
	Manufacturer		Type and rating of fuse
	Fragile, handle with care		Keep dry
	This way up		Stacking limit by number

3 Safety Notice



WARNING: This unit is not a life-support device, and in certain circumstances oxygen therapy can be hazardous, it is suggested that if any patient who needs oxygen treatment, please follow your physician's advice to choose the right flow and period for oxygen before using the oxygen concentrator.



WARNING: In the event of an alarm, if you observe your oxygen concentrator not working properly, or if you feel discomfort, consult your Equipment Provider and /or your physician immediately.



WARNING: Use only voltage specified on rating label.



WARNING: This device manufactures high concentration oxygen, which promotes rapid burning. Keep oxygen concentrator at least 5 feet from open flames or sparks.



WARNING: Do not smoke while your oxygen concentrator is in operation.



WARNING: Do not leave a nasal oxygen cannula under bed coverings or chair cushions.



WARNING: Use no lubricants, grease, or petroleum-based products on or near your oxygen concentrator.



WARNING: Electrical shock hazard. Do not remove covers while the unit is plugged in. Only your Equipment Provider or a qualified service technician should remove the covers or service the unit.



WARNING: Care should be taken to prevent the unit from getting wet or allowing water to enter the unit.



CAUTION: The oxygen concentrator should be set to use in an environment without excessive dust, corruption or toxicological harmful gas.



CAUTION: Do not place the oxygen concentrator in surroundings where its airflow is obstructed.



CAUTION: Do not place items on top of the concentrator.



CAUTION: Always place the concentrator on a hard surface. Never place the concentrator on a surface such as bed or couch, where the concentrator may tip or fall.



CAUTION: NEVER leave the concentrator unattended when plugged in.



CAUTION: Always ensure that both the intake and bottom exhaust vents remain clear of obstruction. Obstruction of either air intake or exhaust venting during operation can permanently damage your concentrator.



CAUTION: It may take up to 5 minutes for the Oxygen Concentrator to reach regular function and normal performance.

NOTE: If oxygen does not seem to flow, first verify that the flowmeter ball is registering a flow. Then, place the tip of the cannula into a glass of water; if bubbles come out of the cannula, oxygen is flowing. If bubbles do not appear, turn off the oxygen concentrator immediately and refer to Troubleshooting.

NOTE: There is never a danger of depleting the oxygen in a room when you use your oxygen concentrator.

Radio Frequency Interference

Most electronic equipment is influenced by Radio Frequency Interference (RFI). When there is strong electromagnetic interference, the LCD may be slightly affected, but the oxygen concentrator is still running. ALWAYS exercise CAUTION with regard to the use of portable communications equipment in the area around such equipment.

Environmental Protection

The materials used in the system do not create an environmental hazard. The packing materials of the system are recyclable, and they must be collected and disposed according to the related regulation in the country or region where the package of the system or its accessories is opened. Any material of the system or accessories, that may cause environmental hazards, must be collected and disposed of in compliance with the local laws and requirements.

4 Product Introduction

The Cirrus 5 oxygen concentrator is a device that extracts oxygen from atmospheric air. It uses an electrically-powered molecular sieve to separate nitrogen from ambient air. The oxygen concentrator can supply a patient with steady oxygen in a safe, reliable, low cost, adjustable flow.

5 Operation Conditions and Environment

Ambient temperature: 10°C-40°C

Relative humidity: 30%-85%

Air pressure: 700 hPa-1060 hPa

Altitude: Up to 2286m without degradation; consult your equipment provider for further information regarding to 2286m to 4000m

Do not operate in environments containing corrosive gas and/or a strong magnetic field.

6 Indications for Use:

The 3B Medical Cirrus 5 Oxygen Concentrator is intended to be used by patients with respiratory disorders who require supplemental oxygen. A high concentration of supplemental oxygen is supplied and a nasal cannula is used to channel oxygen from the concentrator to the patient. The Cirrus 5 can be used in a home, institution, vehicle and various mobile environments.

7 Technical Parameters

Model		Cirrus 5
Rated power (VA)		300
Operation voltage (V/Hz)	AC230/50	
Oxygen flow (L/min)		0.5-5
Oxygen concentration (%)	93%+3%-2%	
Outlet pressure (Mpa)	0.04—0.07	
Alarm	Power failure, low & high pressure, temperature, low purity.	
Sound level (dB(A))		≤40
LCD display	accumulating timing; present timing; timing;	
Large LCD display (optional)	Switch times; pressure digital(accuracy:0.001MPa); accumulating timing(range:0-99999hours); present timing(accuracy:1 minute); presetting timing(accuracy:1 minute) Optional : temperature digital(accuracy:0.1); purity digital; SPO2 digital (accuracy: 1%);	
Electrical category:	Class II Type B	
Net Weight (Kg)		16
Atomization particle (optional)	≤5 μ reaches 90% only for atomization type	
Low purity alarm	when oxygen purity is ≥85%, the blue lamp is on, when oxygen purity is <85%, red lamp is on, indicating low purity Accuracy: ±3%	
Fuse		T5AL/250V

8 Structures and Functions



Figure 1



Figure 2

1. Indicating Lamp

Total 6 indicating lamps and their indication for the Cirrus 5 oxygen concentrator are as follows:

- a. P.O.: power switch (green lamp)
- b. P.F.: power failure (red lamp)
- c. L.P.: low pressure (yellow lamp)
- d. H.P. /H.T: high pressure/ overheated temperature (red lamp)
- e. H.O₂: oxygen purity is $\geq 85\%$, (blue lamp) (Accuracy: $\pm 3\%$)
- f. L.O₂: oxygen purity is $< 85\%$, (red lamp)(Accuracy: $\pm 3\%$)

2. Power switch

3. Oxygen Flow Meter

The location of ball/float in the oxygen flow meter shows the outlet oxygen flow (L/min.).

4. Flow Meter Knob

Adjusts and controls the outlet oxygen flow.

Do not over turn the flow meter knob. Turn counterclockwise to turn on, clockwise to turn off.

5. Outlet for Atomization (optional)

6. **Intake air filter**

7. **Storage cabinet**

For storage of oxygen cannula

8. **LCD display (Liquid crystal display)**

a. Displays operating status of the oxygen concentrator, refer to **7.** on page 9.

b. When starting the oxygen concentrator, the LCD screen will be backlit. It will return to screen saver mode (not lighted) in 15 minutes. Pressing any key during operation will turn on backlight.

10. **Humidifier**

(Accessory Item)

11. **Air Outlet** (optional)

12. **Rating label**

13. **Power Cord Connector**

14. **Power Cord Holder**

9 Operation instructions



CAUTION: Allow for at least 1 foot (12 inches) of clearance away from walls, draperies, furniture, or other obstructions. Do not place the unit in a confined, non-ventilated area.



CAUTION: When turned off, allow at least 5 minutes before restarting concentrator.

9.1. If used with a humidifier, ensure only distilled water is used and the humidifier is filled properly and the lid is secure prior to operation of the concentrator (Fig 3.). Refer to humidifier's manufacturer's guidelines for proper filling, maintenance requirements. Place the humidifier in the proper location (Fig 4). The humidifier must comply with the general requirement of the 93/42/EEC European Directive as appropriate.



Figure 3

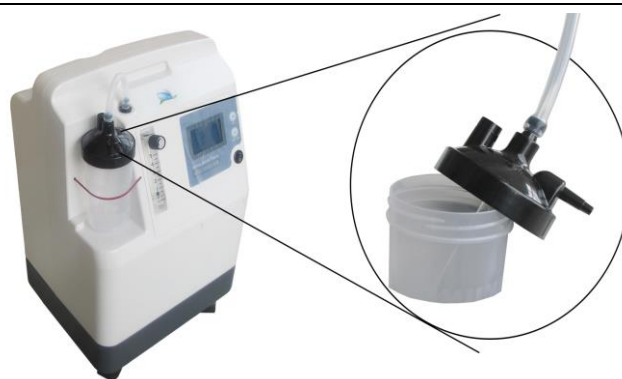


Figure 4

9.2. Connect the nasal oxygen cannula to the humidifier outlet connector or to the concentrator outlet if a humidifier is not is use. The nasal oxygen cannula and Oxygen tubing should be limited to 57 feet in length, in order to ensure that the oxygen flow rate remains within specification values.

9.3. Insert the power plug into the electrical outlet (Fig 6) of the correct voltage and frequency as defined in section 7 (Technical Parameters) on page 9. Press the I/O power switch to the “I” position to turn the unit on, the display LCD the will light (**8.1a**).

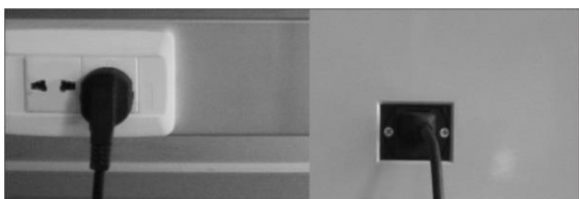


Figure 6

9.4. To set the flow of oxygen, turn the knob on the oxygen flow meter left or right until the ball/float inside the flowmeter centers on the prescribed flow rate (counterclockwise—on, clockwise—off) (Fig 7).



Figure 7

Flow value:

Cirrus 5: 10 position flow value from 0.5 ~ 5L/min on flowmeter as shown in figure. The maximum recommended flow: 5L/min.

In compliance with the ISO8359 standard, the flow supplied is equal to the flow set on the flowmeter, accurate to within $\pm 10\%$ or 200ml/min, whichever is the larger of the two.

The variation of the maximum recommended flow does not exceed $\pm 10\%$ of the indicated value when a back pressure of 7kPa is applied to the output of the device. The maximum outlet pressure is 70kPa.

Oxygen Concentration:

-at 2L/min: >90% (+/- 3%)

-at 5L/min: 93% (+/- 3%)



It is very important to select only the prescribed level of oxygen. Change the flow selection only under the guidance of your physician.

9.5. To turn the unit off, set the I/O power switch to the “O” position. Unplug the unit from the power source during prolonged periods of non use (Fig 8).

Unplug the power plug

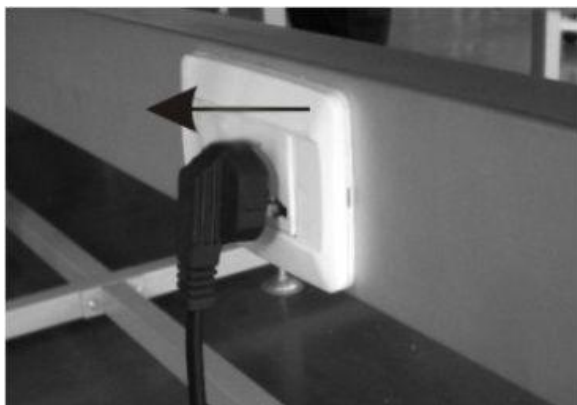


Figure 8

10 Alarms and Safety Devices

10.1 Alarms

a. Power failure alarm: In case of a loss of main power or when the power cord is not plugged into the wall outlet, an audible alarm is activated with red indicator on **(8.1b)** on page 10). The troubleshooting is referred to number **12** on page 19.

b. low/high pressure alarm: There is a pressure sensor on the main board to check the system pressure, when the pressure is lower than 14 PSI, there is an audible alarm with yellow indicator **(8.1c)** on page 10). When the pressure is higher than 33 PSI, there is an audible alarm with red indicator **(8.1d)** on page 10). The oxygen concentrator will shut off in this condition. The troubleshooting is referred to **12** on page 19.

c. Low oxygen concentration alarm (OCSI): The oxygen concentration will rise to the normal operating level in five minutes of operation. When oxygen purity is $\geq 85\%$, the blue indicator **(8.1e)** on page 10) will light. If oxygen purity falls below $< 85\%$, the red indicator lamp will illuminate with audible alarm, indicating low purity **(8.1f)** on page 10). Refer to the troubleshooting on page 19. Or call your supplier to service the device

d. Temperature alarm: There is a temperature sensor on the main board to check the internal temperature, if the internal operating temperature reaches higher than 50°C there is an audible alarm with red indicator on (see H.T. on the lamp) and the oxygen concentrator will shut off. The troubleshooting is referred to number **12** on page 19.

10.2 Safety devices

a. Compressor motor:

Thermal safety is ensured by a thermal switch situated in the motor winding ($145\pm 5^{\circ}\text{C}$).

b. Safety valve:

This is fitted on the compressor outlet and is calibrated to 2.5 bar (250kPa).

11 Maintenance



WARNING: Disconnect the power cord from the electrical outlet before you clean the cabinet (Fig12).



WARNING: Do not operate the concentrator without the filters installed, or while filters are wet. These actions could permanently damage the concentrator.

NOTE: If legally binding regulations govern the installation, service and/or the operation of the product, it is the responsibility of the operator to observe and follow these regulations.

NOTE: Modifying the product is not permitted.

11.1. Cleaning: Clean the outside body with a soft towel with mild soap or detergent, and wipe with dry towel. Avoid getting any water or cleaner inside the unit.



Figure 12

11.2. Air intake filter: It is a critical to inspect the Air Inlet Filter on a routine basis.

To remove: remove the two intake air filters on both sides of the body, clean with mild soap or detergent, rinse thoroughly and ensure filter is dry before reinstalling (Fig 13).



Figure 13

11.3. Clean secondary filter

First, remove the silicone tube connected with oxygen output, take down the humidification bottle, rotate the air filter with a counterclockwise direction as Figure 14, remove the filter cloth, clean with mild soap, rinse with water, wipe off the water. Air dry, then install back to the air filter.



Figure 14

11.4. Clean the humidifier (if a humidifier is in use)

Daily:

- Empty the water from the humidifier.
- Rinse the humidifier clean water.
- Fill humidifier up to the max line with distilled water.

Regularly:

- Disinfect the humidifier parts by cleaning with in a disinfectant solution.
- Rinse and dry.
- Check that the humidifier lid seal is in good condition.

11.5. Clean Oxygen tubing and nasal cannula

Follow the manufacturer's instructions.

11.6. Replacement of fuse tube

Remove the fuse cover, which is part of the power cord connector assembly. Remove the fuse with by using a small screwdriver. Close the fuse cover after fuse is replaced.

The other fuse is located at the intake of internal power line. Follow above instructions to replace.

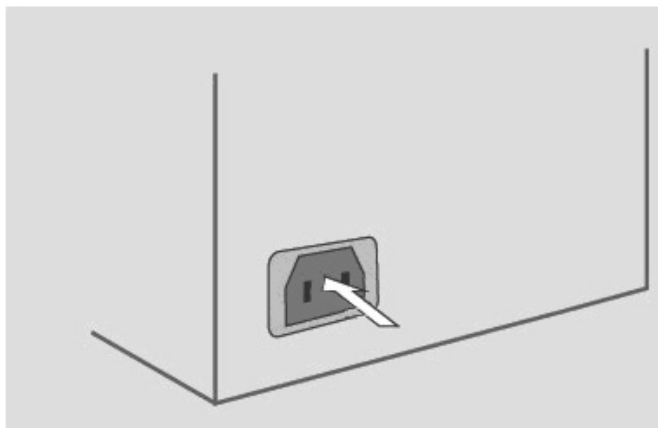


Figure 15

12 Troubleshooting

If your concentrator fails to operate properly, please refer to the troubleshooting chart on the following pages for probable causes and solutions. If problems with the equipment continue, please contact your Equipment Provider.

NOTE: If the unit has not been used for an extended time period, it needs to operate for several minutes before power failure alarm will become activated.

No.	Trouble	Causes	Solution
1	No operation after power connected and the P.F. lamp is lit with audible alarm.	<ol style="list-style-type: none"> 1. No connection between circuit of oxygen concentrator and power 2. Blown fuse. 3. No power supply. 	<ol style="list-style-type: none"> 1. Check all power connections. 2. Replace the fuse.
2	No oxygen flow out of flowmeter or low outtake flow.	<ol style="list-style-type: none"> 1. Crimped or occluded tubing. 2. Filter clogged. 3. Humidifier leaking. 	<ol style="list-style-type: none"> 1. Check for crimped or occluded tubing. 2. Check Air intake filter. 3. Ensure Humidifier connections/lid are properly connected.
3	No exhaust sound	<ol style="list-style-type: none"> 1. Defective air controller. 2. Defective electrical control board. 	<ol style="list-style-type: none"> 1. Turn off the oxygen concentrator and consult your Equipment Provider. 2. Turn off the oxygen concentrator and consult your Equipment Provider.

4	Noisy exhaust flow	<ol style="list-style-type: none"> 1. Check outlet flow muffler. 2. Defective outlet flow muffler. 	<ol style="list-style-type: none"> 1. Turn off the oxygen concentrator and consult your Equipment Provider. 2. Turn off the oxygen concentrator and consult your Equipment Provider.
5	The oxygen concentrator is working but the L.P. lamp is lit with audible alarm.	The system pressure is too low.	<ol style="list-style-type: none"> 1. Turn off the oxygen concentrator and consult your Equipment Provider. 2. Turn off the oxygen concentrator and consult your Equipment Provider.
6	The oxygen concentrator has stopped and the H.T. lamp is lit with audible alarm.	The internal temperature of the oxygen concentrator is too high.	Turn off the oxygen concentrator and consult your Equipment Provider.
7	The oxygen concentrator is stopped and the H.P. lamp is light with audible alarm.	The system pressure is too high.	Turn off the oxygen concentrator and consult your Equipment Provider.
8	The oxygen concentrator is working but the L.O ₂ lamp is light.	Oxygen concentration is too low.	1. Turn off the oxygen concentrator and consult your Equipment Provider.

13 Information on Electromagnetic Compatibility

The Cirrus 5 Oxygen Concentrator needs special precautions regarding EMC and needs to be installed and put into service according to the EMC information provided in the accompanying documents;

Portable and mobile RF communications equipment can affect the Cirrus 5.

All cables and maximum length of cables, Transducers and other accessories with which the manufacturer of the Cirrus 5 claims compliance with the requirements, Accessories that do not affect compliance with the requirements of these sub clauses need not be listed. Accessories, transducers and cables may be specified either generically or specifically.

NOTE:

Transducers and cables sold by the manufacturer of the Cirrus 5 as replacement parts for internal components need not be listed.

The use of accessories, transducers and cables other than those specified, with the exception of transducers and cables sold by the manufacturer of The Cirrus 5 as replacement parts for internal components, may result in increased emissions or decreased immunity of the Cirrus 5.

Guidance and manufacturer's declaration – electromagnetic emissions		
The Cirrus 5 is intended for use in the electromagnetic environment specified below. The customer or the user of the Cirrus 5 should assure that it is used in such an environment.		
Emissions test	Compliance	Electromagnetic environment – guidance
RF emissions CISPR 11	Group 1	The Cirrus 5 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.
RF emissions CISPR 11	Class A	The Cirrus 5 is suitable for use in all establishments other than domestic, and may be used in domestic establishments and those directly connected to the public low-voltage power supply network that supplies buildings used for domestic purposes, provided the following warning is heeded: Warning: This Cirrus 5 is intended for use by healthcare professionals only. This equipment/ system may cause radio interference or may disrupt the operation of nearby equipment. It may be necessary to take mitigation measures, such as re-orienting or relocating the Cirrus 5 or shielding the location.
Harmonic emissions IEC 61000-3-2	Class A	
Voltage fluctuations/ flicker emissions IEC 61000-3-3	Complies	


Guidance and manufacturer's declaration – electromagnetic immunity			
The Cirrus 5 is intended for use in the electromagnetic environment specified below. The customer or the user of the Cirrus 5 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 %.
Electrical fast transient/burst IEC 61000-4-4	± 2 kV for power supply lines ± 1 kV for input/output Lines	± 2 kV for power supply lines ± 1 kV for input/output lines	Mains power quality should be that of a typical commercial or hospital environment.
Surge IEC 61000-4-5	± 1 kV line(s) to line(s) ± 2 kV line(s) to earth	± 1 kV line(s) to line(s) ± 2 kV line(s) to earth	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 % UT (>95 % dip in UT) for 0,5 cycle 40 % UT (60 % dip in UT) for 5 cycles 70 % UT (30 % dip in UT)	<5 % UT (>95 % dip in UT) for 0,5 cycle 40 % UT (60 % dip in UT) for 5 cycles 70 % UT (30 % dip in UT)	Main power quality should be that of a typical commercial or hospital environment. If the user of the Cirrus 5 requires continued operation during power mains interruptions, it is recommended that the Cirrus 5 be powered from an uninterruptible power supply or a battery.

	for 25 cycles <5 % UT (>95 % dip in UT) for 5 s	for 25 cycles <5 % UT (>95 % dip in UT) for 5 s	
Power frequency (50/60 Hz) magnetic field IEC 61000-4-8	3 A/m	Not applicable Note: The Cirrus 5 does not contain components susceptible to magnetic fields, such as Hall elements or magnetic field sensors. Therefore, the EUT is deemed to meet the requirement without actual testing.	Power frequency magnetic fields should be at levels characteristic of a typical location in a typical commercial or hospital environment.

Guidance and manufacturer's declaration – electromagnetic immunity

The Cirrus 5 is intended for use in the electromagnetic environment specified below. The customer or the user of the Cirrus 5 should assure that it is used in such an electromagnetic 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 150 kHz to 80 MHz 3 V/m 80 MHz to 2,5 GHz	3 Vrms 150 kHz to 80 MHz 3 V/m 80 MHz to 2,5 GHz	Portable and mobile RF communications equipment should be used no closer to any part of the Cirrus 5, including cables, than the recommended separation distance calculated from the equation applicable to the frequency of the transmitter. Recommended separation distance $d = 1.17\sqrt{P}$ $d = 1.17\sqrt{P}$ 80 MHz to 800 MHz $d = 2.33\sqrt{P}$ 800 MHz to 2,5 GHz where P is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer and d is the recommended separation distance in meters (m). Field strengths from fixed RF transmitters, as

			<p>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> 
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NOTE 1 At 80 MHz and 800 MHz, 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 Cirrus 5 is used exceeds the applicable RF compliance level above, the Cirrus 5 should be observed to verify normal operation. If abnormal performance is observed, additional measures may be necessary, such as re-orienting or relocating the Cirrus 5.

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

Recommended separation distances between portable and mobile RF communications equipment and the Cirrus 5

The Cirrus 5 is intended for use in an electromagnetic environment in which radiated RF disturbances are controlled. The customer or the user of the Cirrus 5 can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communications equipment (transmitters) and the Cirrus 5 as recommended below, according to the maximum output power of the communications equipment.

Rated maximum output power of transmitter W	Separation distance according to frequency of transmitter m		
	150 kHz to 80 MHz $d = 1.17\sqrt{P}$	80 MHz to 800 MHz $d = 1.17\sqrt{P}$	800 MHz to 2,5 GHz $d = 1.17\sqrt{P}$
0.01	0.12	0.12	0.07
0.1	0.37	0.37	0.22
1	1.17	1.17	0.70
10	3.69	3.69	2.21
100	11.67	11.67	7.00

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 At 80 MHz and 800 MHz, the separation distance for 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.

14 Accessories

Your concentrator includes the following components:

- Intake air filter (two pieces, part number:GL-01)
- Secondary filter (one piece, part number:GL-02)

The concentrator comes with two air filters and one secondary filter already installed.



WARNING: Please use the parts mentioned in this chapter. The use of other parts can degrade minimum safety and performance.



WARNING: Please choose the suitable humidifier and Nasal oxygen cannula, they must:

- be oxygen compatible,
- be biocompatible,
- include a means to prevent the propagation of fire and accord with requirements of ISO 8359:1996/Amd.1:2012

15 Condition for Transportation and Storage

Environment temperature scale: -40~55°C

Comparative humidity scale: ≤95%

Air pressure scale: 700 –1060 hpa

16 Contact us

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