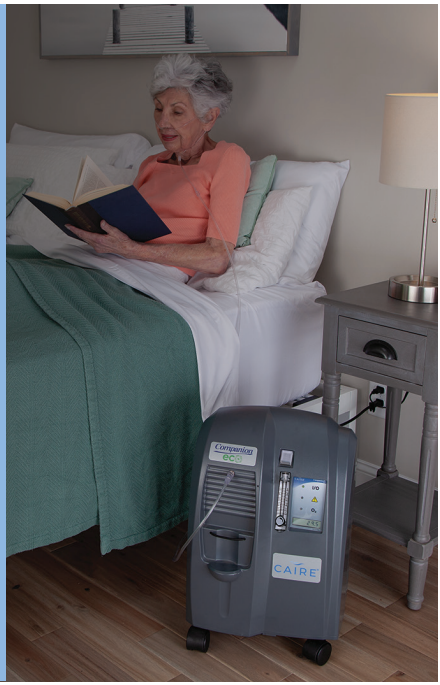
CAIRE®

Companion 5™



User Manual (English)

User Controls & System Status Indicators

Internal Symbols	
O_2	Oxygen Output
I/O	On/Off Switch
	No serviceable parts inside. Do not open cover.
	Keep away from flammable materials, oil and grease.
ISO 7000; Graphical symbols for use on equipment—Index and synopsis	
	Storage or operating temperature range. Reg. # 0632
	Storage humidity range. Reg. # 2620
	Name and address of manufacturer. Reg. # 3082
	Date of manufacture. Reg. # 2497
REF	Catalog Number. Reg. # 2493
SN	Serial Number. Reg. # 2498
	This way up. Reg. # 0623
	Fragile, handle with care. Reg. # 0621
	Keep away from rain, keep dry. Reg. # 0626
	Read user's manual before operation. Reg. # 1641
	Caution, consult accompanying documents. Reg. # 0434A
	Stacking limit by number. Reg. # 2403
ISO 7010: Graphical symbols—Safety colors and safety signs—Registered safety signs	
	The instruction manual must be read. Reg. # M002
	Warning. Reg. # W001

	Keep away from open flame, fire, sparks. Open ignition source and smoking prohibited. Reg. # P003
	Do not smoke near unit or while operating unit. Reg. # P002
Council Directive 93/42/EEC; concerning medical devices	
EC REP	Authorized representative in the European Community
CE ####	This device complies with the requirements of Directive 93/42/EEC concerning medical devices. It bears the CE marking as shown. CE#### indicates notified body number.
IEC 60417	
	Class II Equipment, Double Insulated Reg. # 5172
	Type BF applied part (degree of protection against electric shock). Reg. # 5333
QPS	
	Safety agency for CAN/CSA C22.2 No. 60601-1-14 for medical electrical equipment. Certified for both the U.S. and Canadian markets, to the applicable U.S. and Canadian standards.
Contains FCC ID: WAP2001 FCC Notice	
21 CFR 801.15: Code of Federal Regulations Title 21	
RX ONLY	Federal law restricts this device to sale by or on the order of a physician.
Council Directive 2012/19/EU: waste electrical and electronic equipment (WEEE)	
	WEEE
IEC 60601-1: Medical electrical equipment Part 1 General requirements for basic safety and essential performance	
IP21	Drip Proof Equipment-IP21: The Companion 5 provides protection against the harmful effects of the ingress of liquids. (IP21, per IEC 60529)

FCC NOTICE:
This device may contain CYBLE-022001-00, including the antenna 2450AT18B100 from Johnson Technology, complies with part 15 of the FCC rules. The device meets the requirements for modular transmitter approval as detailed in FCC public Notice DA00-1407. Transmitter operation is subject to the following two conditions (1) This device may not cause harmful interference, and (2) This device must accept any interference received, including interference that may cause undesired operation.

This product may be covered by one or more patents, US and international. Please visit our website below for the listing of applicable patents. Pat.: www.caireinc.com/corporate/patents/ .

Quick Start Guide

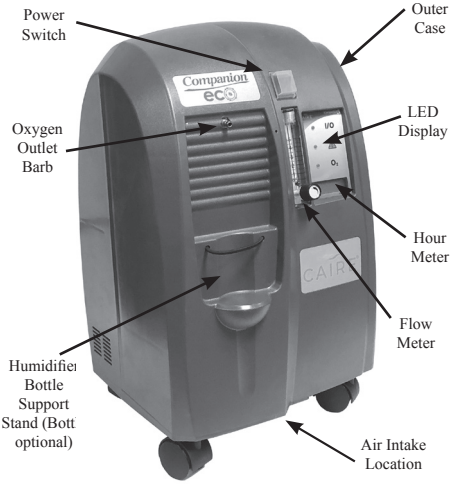
1 Unpack Your Companion 5

Companion 5

2 Getting to Know Your Companion 5

Review all Warnings, Cautions and additional device information in the rest of this manual. Become familiar with the key features of the Companion 5 and the User Control Panel.

FRONT



BACK

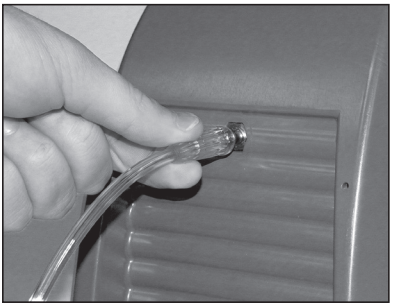
The Companion 5 Components

Outer Case	Durable plastic case that encloses and protects the inner components of the CAIRE Companion 5.
Power Switch	ON/OFF power switch used to initiate or stop power supply to the unit. The ON position is indicated by the "I" symbol, and the OFF position is indicated by the "O" symbol.
Outlet Barb	Oxygen exits the Companion 5 here after it has been filtered and concentrated. Either a single lumen nasal cannula or standard oxygen tubing is attached to deliver to the patient. The maximum length of oxygen tubing attached to the concentrator is 50 ft. (15.2 m).
LED Display	Contains a green and yellow* LED light. The green light indicates normal operation, and the yellow* lights indicate alarms conditions. (See the Alarm Conditions section of the instruction for more information.)
Hour Meter	Digital display of the elapsed operation time of the concentrator. Displays to the nearest tenth of an hour and cannot be reset. Displays diagnostic alarm codes when the concentrator experiences an alarm condition.
Flow Meter	Used to adjust and display the flow rate of oxygen that is delivered. Flow rates range from 0.5 - 5 liters per minute (LPM) and can be adjusted by turning the knob.
Humidifier Bottle Support Stand (Bottle optional)	Location to attach a humidifier bottle. The stand contains an elastic band used to secure the bottle on the stand. A humidifier bottle provides additional moisture to the oxygen flow. The bottle is filled with distilled water, and the moisture is used to prevent drying of the nasal tissues.
	*Oxygen Concentrator Status Indicator (OCSI) models only

3 Attaching Humidifier Bottle and Cannula

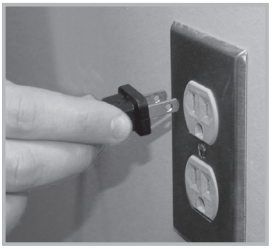
If using a humidifier bottle, first fill the bottle with distilled water to the manufacturer's specified level. Place bottle in designated support stand and secure with the elastic band. Connect the threaded end of the humidifier tube to the bottle, and the other to the Companion 5 outlet barb. Connect oxygen tubing and/or a nasal cannula to the outlet barb on the humidifier bottle.

If not using a humidifier bottle, connect the oxygen tubing and/or a nasal cannula directly to the Companion 5 outlet barb.



4 Power On and Warm Up

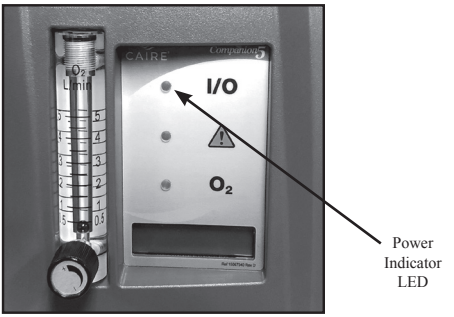
Plug the AC power cord into an AC outlet.



Toggle the Power Switch to the On position.

When the Companion 5 is powered on properly, the green power indicator on the LED Display will light up. All LED lights will illuminate upon start-up. After the concentrator completes the warm-up cycle, only the green light will remain on.

Note: After initially powering on, the O_2 light will illuminate and "O_2 UP" will display on the screen until the concentration reaches specifications.



6 Adjust Flow Setting to Prescribed Level

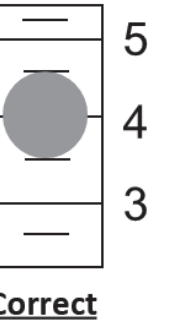
Use the Flow Control Knob to select the flow prescribed by your physician.

WARNING: IT IS VERY IMPORTANT TO SELECT ONLY THE PRESCRIBED LEVEL OF OXYGEN. DO NOT CHANGE THE FLOW SELECTION UNLESS YOU HAVE BEEN DIRECTED TO DO SO BY A LICENSED CLINICIAN. THE OXYGEN CONCENTRATOR MAY BE USED DURING SLEEP UNDER THE RECOMMENDATION OF A QUALIFIED CLINICIAN.

Breathe normally through the nasal cannula.

To adjust flow rate:
Turn counter-clockwise to increase flow.
Turn clockwise to decrease flow.

The middle of the ball indicates flow rate. See picture below.



Important!

Safety Instructions are defined as follows:

WARNING: IMPORTANT SAFETY INFORMATION FOR HAZARDS THAT MIGHT CAUSE SERIOUS INJURY.

CAUTION: Important information for preventing damage to the Companion 5.

Note: Information needing special attention.

Indications for Use

Intended Use

The Companion 5 is intended for the administration of supplemental oxygen. The device is not intended for life support, nor does it provide any patient monitoring capabilities.

WARNING: IT IS VERY IMPORTANT TO SELECT ONLY THE PRESCRIBED LEVEL OF OXYGEN. DO NOT CHANGE THE FLOW SELECTION UNLESS YOU HAVE BEEN DIRECTED TO DO SO BY A LICENSED CLINICIAN. THE PORTABLE OXYGEN CONCENTRATOR MAY BE USED DURING SLEEP UNDER THE RECOMMENDATION OF A QUALIFIED CLINICIAN.

WARNING: TO ENSURE RECEIVING THE THERAPEUTIC AMOUNT OF OXYGEN DELIVERY ACCORDING TO YOUR MEDICAL CONDITION, COMPANION 5 MUST BE USED ONLY AFTER ONE OR MORE SETTINGS HAVE BEEN INDIVIDUALLY DETERMINED OR PRESCRIBED FOR YOU AT YOUR SPECIFIC ACTIVITY LEVELS. COMPANION 5 MUST BE USED WITH THE SPECIFIC COMBINATION OR PARTS AND ACCESSORIES THAT ARE IN LINE WITH THE SPECIFICATION OF THE CONCENTRATOR MANUFACTURER AND THAT WERE USED WHILE YOUR SETTINGS WERE DETERMINED.

WARNING: THIS UNIT IS NOT TO BE USED FOR LIFE SUPPORT. GERIATRIC, PEDIATRIC, OR ANY OTHER PATIENT UNABLE TO COMMUNICATE DISCOMFORT CAN REQUIRE ADDITIONAL MONITORING AND/OR A DISTRIBUTED ALARM SYSTEM TO CONVEY THE INFORMATION ABOUT THE DISCOMFORT AND OR THE MEDICAL URGENCY TO THE RESPONSIBLE CARE GIVER TO AVOID HARM. PATIENTS WITH HEARING AND/OR SIGHT IMPAIRMENT(S) MAY NEED ASSISTANCE WITH MONITORING ALARMS.

WARNING: PREGNANT OR NURSING WOMEN SHOULD NOT USE ACCESSORIES RECOMMENDED IN THIS MANUAL, THEY MY CONTAIN PHTHALATES.

WARNING: FEDERAL (USA) LAW RESTRICTS THIS DEVICE TO SALE OR RENTAL BY ORDER OF A PHYSICIAN OR OTHER LICENSED HEALTH CARE PROVIDER.

Contraindications for Use

WARNING: IN CERTAIN CIRCUMSTANCES, THE USE OF NON-PRESCRIBED OXYGEN CAN BE HAZARDOUS. THIS DEVICE SHOULD ONLY BE USED WHEN PRESCRIBED BY A PHYSICIAN.

WARNING: NOT FOR USE IN THE PRESENCE OF FLAMMABLE ANESTHETICS.

WARNING: AS WITH ANY ELECTRICALLY POWERED DEVICE, THE USER MAY EXPERIENCE PERIODS OF NON-OPERATION AS A RESULT OF ELECTRICAL POWER INTERRUPTION, OR THE NEED TO HAVE THE COMPANION 5 SERVICED BY A QUALIFIED TECHNICIAN. THE COMPANION 5 IS NOT APPROPRIATE FOR ANY PATIENT WHO WOULD EXPERIENCE ADVERSE HEALTH CONSEQUENCES AS THE RESULT OF SUCH TEMPORARY INTERRUPTION.

Safety Guidelines

WARNING: NO MODIFICATION OF THIS EQUIPMENT IS PERMITTED

WARNING: THE MANUFACTURER RECOMMENDS AN ALTERNATE SOURCE OF SUPPLEMENTAL OXYGEN IN THE EVENT OF A POWER OUTAGE, ALARM CONDITION, OR MECHANICAL FAILURE. CONSULT YOUR PHYSICIAN OR EQUIPMENT PROVIDER FOR THE TYPE OF RESERVE SYSTEM REQUIRED.

WARNING: THIS DEVICE SUPPLIES HIGH-CONCENTRATION OXYGEN THAT PROMOTES RAPID BURNING. DO NOT ALLOW SMOKING OR OPEN FLAMES WITHIN TWO (2) METERS OF (1) THIS DEVICE, OR (2) ANY OXYGEN-CARRYING ACCESSORY. FAILURE TO OBSERVE THIS WARNING CAN RESULT IN SEVERE FIRE, PROPERTY DAMAGE, AND/OR CAUSE PHYSICAL INJURY OR DEATH.

WARNING: DO NOT OPERATE UNIT IN A RESTRICTED OR CONFINED SPACE (I.E., A SMALL CASE OR HANDBAG) WHERE VENTILATION CAN BE LIMITED. THIS CAN CAUSE THE OXYGEN CONCENTRATOR TO OVERHEAT AND IMPAIR PERFORMANCE.

WARNING: THE CONCENTRATOR SHOULD BE LOCATED AS TO AVOID SMOKE, POLLUTANTS OR FUMES.

WARNING: THE USE OF SOME OXYGEN ADMINISTRATING ACCESSORIES NOT SPECIFIED FOR THIS OXYGEN CONCENTRATOR MAY IMPAIR ITS PERFORMANCE. RECOMMENDED ACCESSORIES ARE REFERENCED WITHIN THIS MANUAL.

WARNING: IF THE OXYGEN CONCENTRATOR HAS BEEN DROPPED, DAMAGED OR EXPOSED TO WATER PLEASE CONTACT YOUR HOME CARE PROVIDER FOR INSPECTION OR POSSIBLE REPAIR OF THE DEVICE. DO NOT USE THE OXYGEN CONCENTRATOR IF IT HAS A DAMAGED POWER CORD OR PLUG.

WARNING: DO NOT ALLOW EITHER THE AIR INTAKE OR THE AIR OUTLET VENTS TO BECOME BLOCKED. DO NOT DROP OR INSERT ANY OBJECTS INTO ANY OPENINGS ON THE DEVICE. THIS CAN CAUSE THE OXYGEN CONCENTRATOR TO OVERHEAT AND IMPAIR PERFORMANCE.

WARNING: DO NOT OVERFILL THE OPTIONAL HUMIDIFIER. FILL THE OPTIONAL HUMIDIFIER WITH WATER ONLY TO THE LEVEL SHOWN BY THE MANUFACTURER OF THE HUMIDIFIER.

WARNING: DO NOT OPERATE THIS EQUIPMENT WITHOUT FIRST READING AND UNDERSTANDING THIS MANUAL. IF YOU ARE UNABLE TO UNDERSTAND THE WARNINGS AND INSTRUCTIONS, CONTACT YOUR EQUIPMENT PROVIDER BEFORE ATTEMPTING TO USE THIS EQUIPMENT; OTHERWISE, INJURY OR DAMAGE MAY RESULT.

WARNING: IF YOU FEEL DISCOMFORT OR ARE EXPERIENCING A MEDICAL EMERGENCY, SEEK MEDICAL ASSISTANCE IMMEDIATELY.

WARNING: OPERATING THE OXYGEN CONCENTRATOR OUTSIDE OF THE OPERATIONAL TEMPERATURE SPECIFICATIONS CAN LIMIT THE CONCENTRATOR'S ABILITY TO MEET OXYGEN CONCENTRATION SPECIFICATION. REFER TO THE SPECIFICATION SECTION OF THIS MANUAL FOR TEMPERATURE LIMITS.

WARNING: USE NO OIL, GREASE, OR PETROLEUM-BASED OR OTHER FLAMMABLE PRODUCTS WITH THE OXYGEN-CARRYING ACCESSORIES OR THE OXYGEN CONCENTRATOR. ONLY WATER BASED, OXYGEN COMPATIBLE LOTIONS OR SALVES SHOULD BE USED. OXYGEN ACCELERATES THE COMBUSTION OF FLAMMABLE SUBSTANCES.

WARNING: 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.

WARNING: THE MANUFACTURER RECOMMENDS AN ALTERNATE SOURCE OF SUPPLEMENTAL OXYGEN IN THE EVENT OF A POWER OUTAGE, ALARM CONDITION, OR MECHANICAL FAILURE. CONSULT YOUR PHYSICIAN OR EQUIPMENT PROVIDER FOR THE TYPE OF RESERVE SYSTEM REQUIRED.

WARNING: THIS DEVICE SUPPLIES HIGH-CONCENTRATION OXYGEN THAT PROMOTES RAPID BURNING. DO NOT ALLOW SMOKING OR OPEN FLAMES WITHIN THE SAME ROOM OF (1) THIS DEVICE, OR (2) ANY OXYGEN-CARRYING ACCESSORY. FAILURE TO OBSERVE THIS WARNING CAN RESULT IN SEVERE FIRE, PROPERTY DAMAGE, AND/OR CAUSE PHYSICAL INJURY OR DEATH.

WARNING: THE USE OF SOME OXYGEN ADMINISTRATING ACCESSORIES NOT SPECIFIED FOR THIS OXYGEN CONCENTRATOR MAY IMPAIR ITS PERFORMANCE. RECOMMENDED ACCESSORIES ARE REFERENCED WITHIN THIS MANUAL.

WARNING: IF THE OXYGEN CONCENTRATOR HAS BEEN DROPPED, DAMAGED OR EXPOSED TO WATER PLEASE CONTACT YOUR HOME CARE PROVIDER FOR INSPECTION OR POSSIBLE REPAIR OF THE DEVICE. DO NOT USE THE OXYGEN CONCENTRATOR IF IT HAS A DAMAGED POWER CORD OR PLUG.

WARNING: USE ONLY SPARE PARTS RECOMMENDED BY THE MANUFACTURER TO ENSURE PROPER FUNCTION AND TO AVOID THE RISK OF FIRE AND BURNS.

WARNING: DO NOT LUBRICATE FITTINGS, CONNECTIONS, TUBING OR OTHER ACCESSORIES OF THE OXYGEN CONCENTRATOR TO AVOID THE RISK OF FIRE AND BURNS.

WARNING: SMOKING WHILE USING OXYGEN IS THE NUMBER ONE CAUSE OF FIRE INJURIES AND RELATED DEATHS. YOU MUST FOLLOW THESE SAFETY WARNINGS:

WARNING: DO NOT ALLOW SMOKING, CANDLES, OR OPEN FLAMES IN THE SAME ROOM WITH THE DEVICE OR THE OXYGEN-CARRYING ACCESSORIES.

WARNING: SMOKING WHILE WEARING AN OXYGEN CANNULA MAY CAUSE FACIAL BURNS AND POSSIBLY DEATH.

WARNING: IF YOU SMOKE, THESE 3 STEPS MAY SAVE YOUR LIFE: TURN OFF THE OXYGEN CONCENTRATOR, TAKE OFF THE CANNULA, AND LEAVE THE ROOM WHERE THIS DEVICE IS LOCATED.

WARNING: "NO SMOKING – OXYGEN IN USE" SIGNS MUST BE PROMINENTLY DISPLAYED IN THE HOME, OR WHERE OXYGEN IS IN USE. PATIENTS AND THEIR CAREGIVERS MUST BE INFORMED ABOUT THE DANGERS OF SMOKING IN THE PRESENCE OF, OR WHILE USING, MEDICAL OXYGEN.

WARNING: DO NOT USE YOUR OXYGEN CONCENTRATOR IN THE PRESENCE OF FLAMMABLE GASES. THIS CAN RESULT IN RAPID BURNING CAUSING PROPERTY DAMAGE, BODILY INJURIES OR DEATH.

WARNING: REMOVING THE CANNULA AND PUTTING IT ON CLOTHING, BEDDING, SOFAS, OR OTHER CUSHION MATERIAL WILL CAUSE A FLASH FIRE WHEN EXPOSED TO A CIGARETTE, HEAT SOURCE, OR FLAME.

WARNING: DO NOT LEAVE A NASAL CANNULA ON OR UNDER CLOTHING, BED COVERINGS OR CHAIR CUSHIONS. IF THE UNIT IS TURNED ON BUT NOT IN USE, THE OXYGEN WILL MAKE THE MATERIAL FLAMMABLE. SET THE I/0 POWER SWITCH TO THE 0 (OFF) POSITION WHEN THE OXYGEN CONCENTRATOR IS NOT IN USE.

WARNING: DO NOT ATTEMPT ANY MAINTENANCE OTHER THAN THE POSSIBLE SOLUTIONS LISTED WITHIN THIS MANUAL. DO NOT REMOVE COVERS, ONLY YOUR EQUIPMENT PROVIDER OR A QUALIFIED SERVICE TECHNICIAN SHOULD REMOVE THE COVERS OR SERVICE THIS DEVICE.

WARNING: USE ONLY ACCESSORIES RECOMMENDED BY THE MANUFACTURER. USE OF ANY OTHER MAY BE HAZARDOUS, CAUSE SERIOUS DAMAGE TO YOUR OXYGEN CONCENTRATOR AND WILL VOID THE WARRANTY.

CAUTION: Always place oxygen supply tubing and power cords in a manner that prevents a trip hazard.

CAUTION: To prevent a void warranty, follow all manufacturers' instructions.

Note: Portable and mobile RF communications equipment can effect medical electrical equipment.

WARNING: ALWAYS PLACE THE OXYGEN SUPPLY TUBING AND POWER CORDS IN A MANNER THAT PREVENTS TRIP HAZARD OR POSSIBLE ACCIDENTAL STRANGULATION

WARNING: THIS PRODUCT CAN EXPOSE YOU TO CHEMICALS INCLUDING NICKEL, WHICH IS KNOWN TO THE STATE OF CALIFORNIA TO CAUSE CANCER. FOR MORE INFORMATION, GO TO WWW.P65WARNINGS.CA.GOV.

WARNING: IN THE EVENT THERE IS A SERIOUS INCIDENT OCCURRING WITH THIS DEVICE, THE USER SHOULD IMMEDIATELY REPORT THE INCIDENT TO THE PROVIDER AND/OR THE MANUFACTURER. A SERIOUS INCIDENT IS DEFINED AS AN INJURY, DEATH, OR POTENTIAL TO CAUSE INJURY/DEATH SHOULD THERE BE A REOCCURRENCE OF THE INCIDENT. THE USER CAN ALSO REPORT THE INCIDENT TO THE COMPETENT AUTHORITY IN THE COUNTRY WHERE THE INCIDENT OCCURRED.

Specifications

For proper use of the device, the following chart provides important information concerning the recommended operating environments, or operating conditions.

Specifications

Flow Rates	0.5–5.0 LPM ±10% of indicated setting or 200 mL whichever is greater**
O2 Concentration	90% (+5.5%/-3%)
Dimensions	21.5x12.5x13.5" (54.6x31.8x34.3 cm)
Weight	36 lbs (16.3 kg)
Sound Pressure Level	43.74 dB(A) ±0.45 dB(A) @ 3 LPM*
Power Consumption	285 W @ 2 LPM, 350 W Maximum
Maximum Outlet Pressure	6 psig
Operating Temperature	41° F to 104° F (5° to 40°C)
Operating Humidity	15% - 90% at an 82.4° F (28° C) dew point
Storage Temperature	-13° F to 158° F (-25° C to 70° C)
Storage Humidity	0% - 90% Non-Condensing
Electrical	Use no extension cords. Use no electrical outlets controlled by a switch.
Operating Altitude	-1253–9879 feet (-382–3011 meters)
Operating Time	up to 24-hours a day

The expected service life of the equipment is a minimum of five years.

*Per test standard Nr. 14-1 10/2018 MDS-Hi.

** At altitudes higher than 5,000 ft (1524 m) above sea level, flow meter accuracy may be affected up to 25%.

See technical manual (PN 14940840) for sound power level.

WARNING: USE OF DEVICE OUTSIDE OF SPECIFIED OPERATING CONDITIONS MAY ADVERSELY AFFECT THE FLOWRATE AND PERCENTAGE OF OXYGEN AND CONSEQUENTLY THE QUALITY OF THE THERAPY.

Note: If the Oxygen Concentrator has been stored for an extended period of time outside its normal operating temperature range, the unit should be allowed to return to normal operating temperature before being turned on. (Refer to the Specifications section in this manual.)

Proper Placement of the Companion 5

Select a location for the device that avoids the intake of smoke, fumes and pollutants. Correct placement of the device should allow intake of air through the three air intake locations at the top rear and underneath the cabinet, and also allow for exhaust air to freely leave the exhaust vent at the bottom left of the device.

Air intakes are located on the upper back and bottom of the concentrator. Locate the unit so that there is at least 12 inches (30 cm) of space between the concentrator and any walls, furniture, curtains, or other obstructions.

Place the device such that the alarms can be heard.

Position the oxygen supply tubing in such a way that it does not kink or occlude.

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Operating Instructions

Before Operating

This user manual serves as your reference to help you operate and maintain the device. If you have any questions or concerns please call your home care provider.

Important! DO NOT attempt to operate the Companion 5 without first reading the Safety Guidelines section of this manual. Please follow all of the operating instructions. Please observe all Warnings on the device and in the Users Manual. In order to reduce the risk of fire, personal injury and serious damage to the Companion 5, please observe all of the safety precautions.

The CAIRE Companion 5 does not create its own oxygen. It produces highly concentrated oxygen from surrounding room air and delivers it to you. As it naturally exists, room air contains approximately only 21% oxygen by volume.

Room air is drawn into the concentrator by a compressor. The air then travels through a series of filters and a molecular sieve bed that chemically adsorbs nitrogen molecules. As a result, the oxygen-enriched air that exits the concentrator is delivered at 87–95% oxygen by volume.

WARNING: CLEAN THE CABINET, CONTROL PANEL, AND POWER CORD ONLY WITH A MILD HOUSEHOLD CLEANER APPLIED WITH A DAMP (NOT WET) CLOTH OR SPONGE, AND THEN WIPE ALL SURFACES DRY. DO NOT ALLOW ANY LIQUID TO GET INSIDE THE DEVICE. PAY SPECIAL ATTENTION TO THE OXYGEN OUTLET FOR THE CANNULA CONNECTION TO MAKE SURE IT REMAINS FREE OF DUST, WATER, AND PARTICLES.

CAUTION: Do not allow either the air intake or the air outlet vents to become blocked. This can cause the Oxygen Concentrator to overheat and impair performance. Do not operate the Oxygen Concentrator without the air intake filter in place. If a second filter is provided, insert the "replacement" filter before you clean the dirty filter. Clean the dirty filter in a warm soap and water solution then dry thoroughly prior to use.

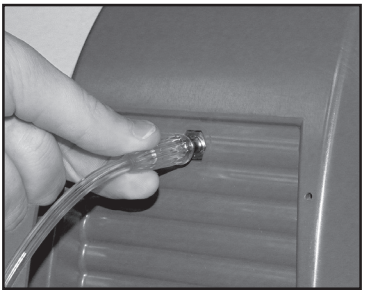
Step 1: Positioning Your Companion 5 for Use

Place the Companion 5 in a well-ventilated, well lit area. Be sure the air inlet and exhaust vents are not obstructed. Position the Companion 5 so that all audible and visual indicators or alarms can be easily seen and heard, and to allow access to the mains plug.

Plug the device into an AC Power outlet.

Step 2: If the Humidifier Bottle WILL NOT be Used

a. Connect a nasal cannula or oxygen tubing directly to the oxygen outlet barb.



b. Proceed to step 4.

Step 3: If the Humidifier Bottle WILL be Used

a. Unscrew the lid from the humidifier bottle.
b. Fill the bottle using distilled water. Make sure the water level is between the manufacturer's specified maximum and minimum levels shown on the bottle.
c. Secure the lid of the humidifier bottle. Ensure that there are no leaks.
d. Connect a nasal cannula or standard oxygen tubing to the outlet barb on the humidifier bottle.

Note: Use of a humidifier not specified for use with this concentrator might affect its performance.

e. Connect the threaded end of the humidifier tube to the lid of the humidifier bottle.

f. Connect the other end of the humidifier tube to the outlet barb of the CAIRE Companion 5.

g. Place the bottle in its designated space on the Humidifier Bottle Support Stand.

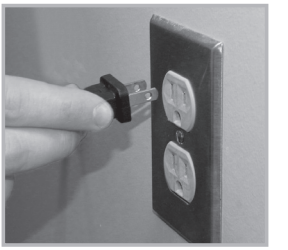
h. Secure the bottle on the stand using the elastic band.

i. Proceed to step 4.

Step 4: Power On and Warm Up

a. Plug the electrical cord of the CAIRE Companion 5 into an AC outlet.

WARNING: INSPECT THE ELECTRICAL CORD FOR DAMAGE BEFORE USE. IF THE CORD IS DAMAGED, DO NOT PLUG IT INTO AN ELECTRICAL OUTLET OR ATTEMPT TO OPERATE THE CONCENTRATOR.



b. Set the power switch to the "ON" (I) position. When the Companion 5 is powered on properly, the green indicator on the LED Display will light up. All LED lights will illuminate momentarily upon start-up.

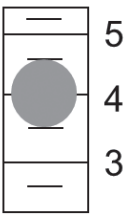
Note: After initially powering on, the O_2 light will illuminate and "O_2 UP" will display on the screen until the concentration reaches specifications.

Step 5: Adjust Flow Control Rate

a. Turn the flow control knob to the oxygen flow rate (LPM) prescribed by your physician.

To adjust flow rate:
Turn counter-clockwise to increase flow.
Turn clockwise to decrease flow.

The middle of the ball indicates flow rate. The image below indicates a flow rate of 4.0 LPM.



Correct

WARNING: IT IS VERY IMPORTANT TO SELECT ONLY THE PRESCRIBED LEVEL OF OXYGEN. DO NOT CHANGE THE FLOW SELECTION UNLESS YOU HAVE BEEN DIRECTED TO DO SO BY A LICENSED CLINICIAN. THE OXYGEN CONCENTRATOR MAY BE USED DURING SLEEP UNDER THE RECOMMENDATION OF A QUALIFIED CLINICIAN.

Step 6: Verify Flow and Breathe Normally

a. Verify that oxygen is indeed flowing through the nasal cannula and that there are no kinks, bends, or blockages in the tubing.

Note: Ensure the cannula is fully inserted and secure. You should hear or feel oxygen flow to the prongs of the nasal cannula.

b. Properly position your nasal cannula and breathe normally through the nasal cannula.

Step 7: Turn Off

a. Press the power switch in the "OFF" (O) position when the CAIRE Companion 5 is no longer in use.

CAUTION: Use only accessories recommended by the manufacturer. Use of any other may be hazardous, cause serious damage to your oxygen concentrator and will void the warranty.

CAUTION: Do not use extension cords with this unit or connect too many plugs into the same electrical outlet. The use of extension cords could adversely affect the performance of the device. Too many plugs into one outlet can result in an overload to the electrical panel causing the breaker/fuse to activate or fire if the breaker or fuse fails to operate.

CAUTION: Use of cables and adapters other than those specified, with the exception of cables and adapters 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.

WARNING: DO NOT ALLOW EITHER THE AIR INTAKE OR THE AIR OUTLET VENTS TO BECOME BLOCKED. THIS CAN CAUSE THE OXYGEN CONCENTRATOR TO OVERHEAT AND IMPAIR PERFORMANCE.

Note: To Equipment Provider: The following oxygen administration accessories are recommended for use with the Companion 5:

• Nasal Cannula: CAIRE Part Number CU002-1

• Humidifier Adaptor Tubing: CAIRE Part number 20843882

• Humidifier Bottle: CAIRE Part Number HU003-1

• Firebreak: CAIRE Part Number 20629671

A firebreak is required for use with any cannula.

• CAIRE offers a firebreak intended to be used in conjunction with the oxygen concentrator. The firebreak is a thermal fuse to stop the flow of gas in the event that the downstream cannula or oxygen tubing is ignited and burns to the firebreak. It is placed in-line with the nasal cannula or oxygen tubing between the patient and the oxygen outlet of the Companion 5. For proper use of the firebreak, always refer to the manufacturer's instructions (included with each firebreak kit).

• Additional recommended accessories information is available online at www.caireinc.com.

Alarm Conditions

Your CAIRE Companion 5 uses a combination of three LED lights and an audible alarm to alert you when there is a malfunction with your concentrator.

1) Green LED (**I/O**)- Indicates normal operation.

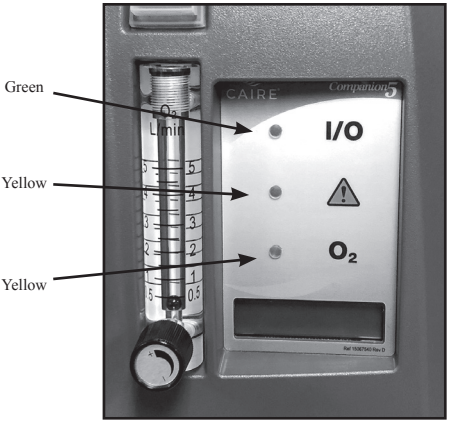
2) Yellow LED (⚠) - Indicates system malfunction. See Alarm Conditions Table below for more details.

3) Yellow LED (**O_2**) - Indicates low oxygen concentration. See Alarm Conditions Table below for more details.

The Alarm Conditions Table on the following page shows the different alarm conditions that can be displayed by the concentrator. It outlines possible causes and the actions you should take if the alarm is experienced. In the case of any alarm, it is recommended that you contact your healthcare provider as soon as possible.

WARNING: DO NOT IGNORE ALARMS

WARNINGS: THE MANUFACTURER RECOMMENDS AN ALTERNATE SOURCE OF SUPPLEMENTAL OXYGEN IN THE EVENT OF A POWER OUTAGE, ALARM CONDITION, OR MECHANICAL FAILURE. CONSULT YOUR PHYSICIAN OR EQUIPMENT PROVIDER FOR THE TYPE OF RESERVE SYSTEM REQUIRED.



Above: Companion 5 with OCSI

Alarm Conditions Table

Audible Alarm	Colored LED	Cause	Your Action
Off	I/O (Green)	The concentrator is working properly.	None
Intermittent	 (Yellow)	The concentrator has lost power but the power switch is still in the "ON" position.	Verify that the concentrator's electrical cord is plugged into an outlet and that the outlet has power. Try a different outlet. If the problem continues, connect to a back-up oxygen supply and contact your healthcare provider.
Intermittent	 (Yellow)	System Malfunction	Turn the power switch in the "OFF" position immediately. Disconnect the AC Power from the wall outlet. Wait 5 minutes. Connect the AC Power back into the wall outlet and turn the concentrator back on again. If the alarm continues, service is required. Connect to a backup oxygen supply and contact your healthcare provider immediately.
Intermittent	 (Yellow)	Product Flow Rate Too High or Too Low	1. Ensure that the cannula is not kinked or blocked. If used with a humidifier bottle, ensure that it is filled properly and not creating a blockage. 2. Ensure that the Companion 5 has proper ventilation. It needs to be at least 12 inches (30 cm) from any surface to ensure the vents are not blocked. 3. If the problem persists, switch to an alternate source of oxygen and contact healthcare provider for assistance.
Intermittent	O_2 (Yellow)	The Companion 5 has detected low oxygen levels.	1. Ensure the air intake filter and exhaust locations are not clogged or restricted. 2. Ensure the Companion 5 is in a well-ventilated area. Make sure there are at least 12 inches between the back and sides of the Companion and any obstructions (furniture, curtain, etc.). 3. If the condition persists, switch to an alternate source of oxygen and contact your healthcare provider immediately.
Intermittent	O_2 (Yellow)	The Companion 5 has detected low oxygen levels.	

Troubleshooting

It is recommended that you contact your healthcare provider if your concentrator displays any alarms or if you feel that your concentrator is not working properly. You should not attempt to repair the concentrator yourself. Repair should only be performed by a trained service technician. However, there are some troubleshooting steps that you can take if you experience problems with your CAIRE Companion 5. They are outlined in the following table. You can use this chart by following the checks for your problem in numerical order.

User Troubleshooting Table

Problem	Possible Cause	Your Action
The concentrator is turned on, but it is not running.	1. The electrical cord is not plugged in to an outlet.	1. Plug in the electrical cord.
	2. The electrical outlet is not providing power.	2. Check your household fuse and circuit. Try a different outlet.
	3. Internal failure.	3. Connect to a back-up oxygen supply. Contact your healthcare provider immediately.
You are experiencing low or no oxygen flow.	1. The flow control setting has been changed.	1. Verify that the flow control knob is set on your appropriate Liter Per Minute (LPM) setting prescribed by your doctor.
	2. Tubing has been disconnected.	2. Verify that the tubing is tight at all connections (outlet barb, humidifier bottle, water trap, etc). Re-secure any connections if necessary.
	3. The oxygen tubing or cannula is kinked.	3. Check for kinks or blockages in your tubing. Repair if needed.
	4. There is a leak in your cannula or tubing.	4. Inspect all tubing and the cannula for leaks. You can do this by either listening or feeling for escaping air. Replace leaky tubing or cannula.
	5. Air flow into the concentrator is impeded.	5. Verify that nothing is blocking the inlets of the concentrator. Be sure it is at least 12 inches (30 cm) away from furniture, walls, or other obstructions.
	6. Internal failure.	6. Connect to a back-up oxygen supply. Contact your healthcare provider immediately.

Note: If your Companion 5 is still alarming after using the Alarm Conditions and Troubleshooting tables, please contact Technical Service at 1-800-482-2473 with the alarm code displayed on the LCD Display.

Cleaning, Care & Routine Maintenance

Routine Maintenance

Routine maintenance consists of changing the handle gross particle filter once per week (if installed).

User Care and Cleaning of the Device

Cannula Replacement

Replace your supply tubing and cannula on a regular basis as recommended by your home care provider. Your physician or home care provider will provide you with cleaning, disinfection and replacement information.

Note: Always follow the cannula manufacturer's instructions for proper use. Replace the disposable cannula as recommended by the cannula manufacturer or your Equipment Provider. Additional supplies are available from your Equipment Provider.

Air Intake Filter (Cartridge)

The Air Intake Filter should only be accessed or changed by your healthcare provider.

Gross Particle Filter:

The gross particle filter is located on the very front bottom of the Companion 5.

You should inspect and clean it once weekly. To clean the filter, use the following process:

1) Remove the gross particle filter.

2) Wash the filter in warm tap water using a mild soap detergent solution.

3) Rinse the filter thoroughly with clear tap water and squeeze out the excess water.

4) Allow the filter to air dry.

5) Reinsert the filter in the cabinet.

Note: The Manufacturer does not recommend the sterilization of this equipment.

Note: Do not operate the Oxygen Concentrator without the air intake filter in place.

Humidifier Bottle (if Applicable)

You should check your humidifier bottle daily to ensure that its water level is between the specified minimum and maximum levels. Refill the bottle as necessary using distilled water. Clean the humidifier bottle in accordance with the manufacturers' instructions.

Cleaning Procedure:

Turn OFF the Companion 5 and disconnect from AC power before any cleaning or disinfecting activity. DO NOT spray the outer case directly. Use a damp (not wet) cloth or sponge. Spray the cloth or sponge with a mild detergent solution to clean the cabinet and power cord. To disinfect the Companion 5, use Lysol® Brand II disinfectant (or equivalent). Dilute as directed by the manufacturer of the cleaning product, but do not spray liquid directly on the Companion 5.

WARNING: ELECTRICAL SHOCK HAZARD. TURN OFF THE UNIT AND DISCONNECT THE POWER CORD FROM THE ELECTRICAL OUTLET BEFORE YOU CLEAN THE UNIT TO PREVENT ACCIDENTAL ELECTRICAL SHOCK AND BURN HAZARD. ONLY YOUR EQUIPMENT PROVIDER OR A QUALIFIED SERVICE TECHNICIAN SHOULD REMOVE THE COVERS OR SERVICE THE UNIT.

WARNING: ELECTRICAL SHOCK HAZARD. TURN OFF THE UNIT AND DISCONNECT THE POWER CORD FROM THE ELECTRICAL OUTLET BEFORE YOU CLEAN THE UNIT TO PREVENT ACCIDENTAL ELECTRICAL SHOCK AND BURN HAZARD. ONLY YOUR EQUIPMENT PROVIDER OR A QUALIFIED SERVICE TECHNICIAN SHOULD REMOVE THE COVERS OR SERVICE THE UNIT.

WARNING: ELECTRICAL SHOCK HAZARD. DISCONNECT THE POWER CORD FROM THE ELECTRICAL OUTLET BEFORE YOU CLEAN THE UNIT TO PREVENT ACCIDENTAL ELECTRICAL SHOCK AND BURN HAZARD. 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 OXYGEN CONCENTRATOR FROM GETTING WET OR ALLOWING FLUIDS TO ENTER THE UNIT. THIS CAN CAUSE A MALFUNCTION OR SHUT DOWN, AND CAUSE AN INCREASED RISK FOR ELECTRICAL SHOCK OR BURNS.

WARNING: IT CAN BE UNSAFE TO INTERCONNECT THE COMPANION 5 WITH OTHER EQUIPMENT

WARNING: CLEAN THE CABINET, CONTROL PANEL, AND POWER CORD ONLY WITH A MILD HOUSEHOLD CLEANER APPLIED WITH A DAMP (NOT WET) CLOTH OR SPONGE, AND THEN WIPE ALL SURFACES DRY. DO NOT ALLOW ANY LIQUID TO GET INSIDE THE DEVICE. PAY SPECIAL ATTENTION TO THE OXYGEN OUTLET FOR THE CANNULA CONNECTION TO MAKE SURE IT REMAINS FREE OF DUST, WATER, AND PARTICLES.

WARNING: DO NOT USE LIQUID DIRECTLY ON THE UNIT. A LIST OF UNDESIRABLE CHEMICAL AGENTS INCLUDES BUT IS NOT LIMITED TO THE FOLLOWING: ALCOHOL AND ALCOHOL-BASED PRODUCTS, CONCENTRATED CHLORINE-BASED PRODUCTS (ETHYLENE CHLORIDE), AND OIL-BASED PRODUCTS (PINE-SOL®, LESTOIL®). THESE ARE NOT TO BE USED TO CLEAN THE PLASTIC HOUSING ON OXYGEN CONCENTRATOR, AS THEY CAN DAMAGE THE UNIT'S PLASTIC.

Disposal

Always return Companion 5, including all components, to your homecare provider for proper disposal. You can also contact your local city or town offices for instructions on proper disposal of the battery.

WEEE and RoHS

This symbol is to remind the equipment owners to return it to a recycling facility at the end of its life, per Waste Electrical and Electronic Equipment (WEEE) Directive.

Our products will comply with the restriction of Hazardous Substances (RoHS) directive. They will not contain more than trace amounts of lead or other hazardous material content.

CAUTION: For proper disposal, contact your equipment provider or local government agency for disposal instructions

EMC Testing

Medical equipment needs special precautions regarding EMC and needs to be installed and put into service according to the EMC information provided in this section.

Guidance and Manufacturer's Declaration—Electromagnetic Emissions		
The Companion 5 is intended for use in the electromagnetic environment specified below. The customer or the user of the Companion 5 should assure that it is used in such an environment.		
Emissions Test	**Compliance**	**Electromagnetic Environment - Guidance**
RF emissions CISPR 11	Group 1	The Companion 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 B	The Companion 5 is suitable for use in all establishments, including domestic establishments and those directly connected to the public low-voltage power supply network that supplies buildings used for domestic purposes.
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 Companion 5 is intended for use in the electromagnetic environment specified below. The customer or the user of the Companion 5 should assure that it is used in such an environment.			
Immunity test	**IEC 60601 test level**	**Compliance level**	**Electromagnetic environment ± guidance**
Electromagnetic environment – guidance IEC 61000-4-2	±8 kV contact ±15 kV air	±8 kV contact ±15 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 N/A	Mains power quality should be that of a typical commercial or hospital environment.
Surge IEC 61000-4-5	±2 kV common mode on AC lines ±1 kV differential on AC lines ±2 kV common mode on outdoor I/O lines	N/A ±1 kV differential on AC lines N/A	Mains power quality should be that of a typical commercial or hospital environment.
Voltage dips, short interruptions and voltage variations on power supply input lines IEC 61000-4-11	0% U_T for 0.5 cycles (0°, 45°, 90°, 135°, 180°, 225°, 270°, 315°) 0% U_T for 1 cycle (0°) 70% U_T (30% dip in U_T) for 25/30 cycles (0°) 0% U_T for 250/300 cycles (0°)	0% U_T for 0.5 cycles (0°, 45°, 90°, 135°, 180°, 225°, 270°, 315°) 0% U_T for 1 cycle (0°) 70% U_T (30% dip in U_T) for 25/30 cycles (0°) 0% U_T for 250/300 cycles (0°)	Mains power quality should be that of a typical commercial or hospital environment. If the user of the Companion 5 requires continued operation during power mains interruptions, it is recommended that the Companion 5 is powered from an uninterruptible power supply (UPS) or a battery.
Power frequency (50/60 Hz) magnetic field IEC 61000-4-8	30 A / m	30 A / m	Power frequency magnetic fields should be at levels characteristic of a typical location in a typical commercial or hospital environment.
NOTE: U_T is the A.C. mains voltage prior to application of the test level.			

Guidance and Manufacturer's Declaration ± Electromagnetic Immunity

The Companion 5 is intended for use in the electromagnetic environment specified below. The customer or the user of the Companion 5 should assure that it is used in such an environment.

Immunity test	IEC 60601 test level	Compliance level	Electromagnetic environment ± guidance
Conducted RF IEC 61000-4-6	3 Vrms 150 kHz to 80 MHz, 1 KHz or 2 KHz, 80% AM modulation (6V in ISM and amateur radio band in this range for home environment)	3 Vrms	Portable and mobile RF communications equipment should be used no closer to any part of the Companion 5, including cables, than the recommended separation distance calculated from the equation applicable to the frequency of the transmitter. Recommended separation distance
Radiated RF IEC 61000-4-3	10 V/m 80 MHz to 2700 MHz, 1 KHz 80% modulation for home environment	10 V/m	$d = 1.2\sqrt{P}$ $d = 1.2\sqrt{P}$ from 80 MHz to 800 MHz $d = 1.2\sqrt{P}$ from 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 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: 

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 Companion 5 is used exceeds the applicable RF compliance level above, the Companion 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 Companion 5.

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

Test specifications for ENCLOSURE PORT IMMUNITY to RF wireless communications equipment

Test frequency (MHz)	Band [a] (MHz)	Service [a]	Modulation [b]	Maximum Power (W)	Distance (m)	Immunity Test Level (V/m)
385	380-390	TETRA 400	Pulse modulation [b] 18 Hz	1.8	0.3	27
450	430-470	GMRS 460, FRS 460	FM [c] ±5 kHZ deviations 1 kHz sine	2	0.3	28
710	704-787	LTE Band 13, 17	Pulse modulation [b] 217 Hz	0.2	0.3	9
745						
780						
810	800-960	GSM 800/900, TETRA 800, iDEN 820, CDMA 850, LTE Band 5	Pulse modulation [b] 18 Hz	2	0.3	28
870						
930						
1720	1700-1990	GSM 1800; CDMA 1900; GSM 1900; DECT; LTE Band 1, 3, 4.25; UMTS	Pulse modulation [b] 217 Hz	2	0.3	28
1845						
1970						
2450	2400-2570	Bluetooth, WLAM, 802.11 b/g/n. RFID 2450, LTE Band 7	Pulse modulation [b] 217 Hz	2	0.3	28
5240	5100-5800	WLAN 802.11 a/n	Pulse modulation [b] 217 Hz	2	0.3	9
5500						
5785						

NOTE: If necessary to achieve the IMMUNITY TEST LEVEL, the distance between the transmitting antenna and the ME EQUIPMENT OR ME SYSTEM may be reduced to 1m. The 1 m test distance is permitted by IEC 61000-4-3.

[a] For some services, only uplink frequencies are included.
[b] The carrier shall be modulated using a 50% duty cycle square wave signal.
[c] As an alternative to FM modulation, 50% pulse modulation at 18 Hz may be used because while it does not represent actual modulation, it would be worst case.

The manufacturer should consider reducing the minimum separation distance, based on risk management, and using higher immunity test levels that are appropriate for the reduced minimum separation distance. Minimum separation distances for higher immunity test levels should be calculated using the following equation:

$$E = \frac{6}{d}\sqrt{P}$$

Where P is the maximum power in W, d is the minimum distance in m, and E is the immunity test level in V/m.

If the ME EQUIPMENT or ME SYSTEM complies with higher immunity test levels or this test, the 30 cm minimum separation distance in 5.2.1.1 f) may be replaced with minimum separation distances calculated from the higher immunity test levels.

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

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

Rated maximum output power of transmitter	**Separation distance according to frequency of transmitter (m)**		
	150 kHz to 80 MHz	**80 MHz to 800 MHz**	**800 MHz to 2,5 GHz**
W	$d = 1.2\sqrt{P}$	$d = 1.2\sqrt{P}$	$d = 1.2\sqrt{P}$
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 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.

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