

**XPO<sub>2</sub><sup>TM</sup>**  
**Portable Oxygen**  
**Concentrator**

**Models XPO100, XPO100B, XPO100B-EU, XPO100B-UK  
and XPO100B-AU**



**DEALER:** Keep this manual. The procedures in this manual **MUST** be performed by a qualified technician.

For more information regarding  
Invacare products, parts, and services,  
please visit [www.invacare.com](http://www.invacare.com)



*Yes, you can.*

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**⚠ WARNING**

**DO NOT USE THIS PRODUCT OR ANY AVAILABLE OPTIONAL EQUIPMENT WITHOUT FIRST COMPLETELY READING AND UNDERSTANDING THESE INSTRUCTIONS AND ANY ADDITIONAL INSTRUCTIONAL MATERIAL SUCH AS OWNER'S MANUALS, SERVICE MANUALS OR INSTRUCTION SHEETS SUPPLIED WITH THIS PRODUCT OR OPTIONAL EQUIPMENT. IF YOU ARE UNABLE TO UNDERSTAND THE WARNINGS, CAUTIONS OR INSTRUCTIONS, CONTACT A HEALTHCARE PROFESSIONAL, DEALER OR TECHNICAL PERSONNEL BEFORE ATTEMPTING TO USE THIS EQUIPMENT - OTHERWISE, INJURY OR DAMAGE MAY OCCUR.**

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**⚠ ACCESSORIES WARNING**

**INVACARE PRODUCTS ARE SPECIFICALLY DESIGNED AND MANUFACTURED FOR USE IN CONJUNCTION WITH INVACARE ACCESSORIES. ACCESSORIES DESIGNED BY OTHER MANUFACTURERS HAVE NOT BEEN TESTED BY INVACARE AND ARE NOT RECOMMENDED FOR USE WITH INVACARE PRODUCTS.**

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*NOTE: Updated versions of this manual can be found at [www.invacare.com](http://www.invacare.com).*

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## SPECIAL NOTES

Signal words are used in this manual and apply to hazards or unsafe practices which could result in personal injury or property damage. Refer to the following table for definitions of the signal words.

SIGNAL WORD	MEANING
DANGER	Danger indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.
WARNING	Warning indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.
CAUTION	Caution indicates a potentially hazardous situation which, if not avoided, may result in property damage or minor injury or both.

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### NOTICE

The information contained in this document is subject to change without notice.

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### DANGER

**DO NOT SMOKE** while using this device. Keep all matches, lit cigarettes, candles or other sources of ignition out of the room in which this product is located and away from where oxygen is being delivered.

**NO SMOKING** signs should be prominently displayed. Textiles and other materials that normally would not burn are easily ignited and burn with great intensity in oxygen enriched air. Failure to observe this warning can result in severe fire, property damage and cause physical injury or death.











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### CAUTION

“Caution: Federal law restricts this device to sale or rental by or on order of a physician, or any other practitioner licensed by the law of the State in which he/she practices to use or order the use of this device.”

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# TYPICAL PRODUCT PARAMETERS

	Direct Current
	Type BF equipment
	Attention - Consider Accompanying Documents
	DO NOT smoke
	Class II, Double Insulation
	Power On/Off
	DO NOT dispose of in household waste
	Recycle
	DO NOT use oil or grease
	Keep dry
<b>IPX1</b>	Protected against dripping water

Electrical Requirements:	AC Power Supply: 100-240 VAC 50/60 Hertz
	DC Power Supply: 11-16 VDC
Rated Current Input:	1.0 amps at 120 VAC
	3.3 amps at 18 VDC
Sound Level @ setting 2:	≤ 45dBA weighted
Altitude:	Up to 10,000 ft (3046 m) above sea level
Oxygen Concentration: *Based on an atmospheric pressure of 14.7 psi (101 kPa) at 70°F (21°C)	87% to 95.6%, after initial warm-up period (approximately 5 minutes)
Oxygen Flow:	Pulse flow delivery. Bolus Volume Ranges From 300 - 840cc settings 1 to 5.
Dimensions:	10" high x 7" wide x 4" deep (25.4 cm high x 17.8 cm wide x 10.2 cm deep)
Weight:	6.0 lbs (2.72 kg); 1.3 lbs (0.68 kg) for supplemental battery

## TYPICAL PRODUCT PARAMETERS

Battery Duration (times are approximate):	Setting 1 = 3.5 hours
	Setting 2 = 2.5 hours
	Setting 3 = 2.0 hours
	Setting 4 = 1.5 hours
	Setting 5 = 1.0 hours
Battery Recharge Time: <i>NOTE: Recharge time increases if battery is charging while unit is running.</i>	4 hours
Humidity	Operating Humidity: 15% to 60% non condensing
	Storage Humidity: up to 95% non condensing
Temperature Range: (All power sources)	Operating temperature: 41°F to 95°F (5°C to 35°C)
	Storage temperature: -2°F to 140°F (-20°C to 60°C)
Extended Temperature Range: (Using AC or DC adapters)	Operating Temperature: 95°F to 104°F (35°C to 40°C) Continuous use - all settings
Extended Temperature Range (Using Internal Battery)	Operating Temperature: 95°F to 104°F (35°C to 40°C) Continuous use - settings 1, 2 and 3 45 minutes (max) - setting 4 30 minutes (max) - setting 5

## Regulatory Listing

ETL certified complying with:	EN 55011:1998
	CISPR 11: 2003
	IEC 60601-1; 2nd ed. 2005
	IEC 60601-1-2; 2.1 ed.
	IEC 61000-3-2:2005
	IEC 61000-3-3:2005
	UL 60601-1, 1st ed.
	CSA 601.1 M90

# SECTION I—IMPORTANT SAFEGUARDS

In order to ensure the safe installation, assembly and operation of the XPO<sub>2</sub> Portable Concentrator these instructions **MUST** be followed.

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## **⚠ WARNING**

SECTION 1 - IMPORTANT SAFEGUARDS contains important information for the safe operation and use of this product.

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## **Operating Information**

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### **⚠ DANGER**

A spontaneous and violent ignition may occur if oil, grease, greasy substances, or petroleum based products come in contact with oxygen under pressure. These substances **MUST** be kept away from the XPO<sub>2</sub> portable concentrator, tubing and connections, and all other oxygen equipment. **DO NOT** use any lubricants unless recommended by Invacare.

## **To Reduce The Risk Of Burns, Electrocution, Fire Or Injury To Persons**

**DO NOT** come in contact with the concentrator while wet.

**DO NOT** place or store product where it can drop into water or other liquid.

**DO NOT** reach for product that has fallen into water. **Unplug IMMEDIATELY.**

**Avoid creation of any spark near medical oxygen equipment. This includes sparks from static electricity created by any type of friction.**

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**NEVER** drop or insert any object or liquid into any opening.

For optimum performance, Invacare recommends that each concentrator be On, in auto-pulse mode, and running for a minimum of 5 minutes. Shorter periods of operation may reduce maximum product life. Refer to Checking O<sub>2</sub> Purity on page 14 for auto-pulse mode.

A product should **NEVER** be left unattended when plugged in. Make sure XPO<sub>2</sub> is Off when not in use.

The XPO<sub>2</sub> **MUST** be used in an upright position.

**DO NOT** connect the concentrator in parallel or series with other oxygen concentrators or oxygen therapy devices.

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## Radio Frequency Interference

This equipment has been tested and found to comply with EMC limits specified by IEC/EN 60601-1-2. These limits are designed to provide a reasonable protection against electromagnetic interference in a typical medical installation.

Other devices may experience interference from even the low levels of electromagnetic emissions permitted by the above standards. To determine if the emissions from the XPO<sub>2</sub> are causing the interference, turn the XPO<sub>2</sub> Off. If the interference with the other device(s) stops, then the XPO<sub>2</sub> is causing the interference. In such rare cases, interference may be reduced or corrected by one of the following measures:

- Reposition, relocate, or increase the separation between the equipment.
- Connect the equipment into an outlet on a circuit different from that to which the other device(s) is connected.



# SECTION 2—COMPONENT REPLACEMENT

## CAUTION

Ensure not to damage ribbon cable when removing or installing front cover.  
DO NOT use Methyl Ethyl Ketone (MEK). This will damage the plastic.

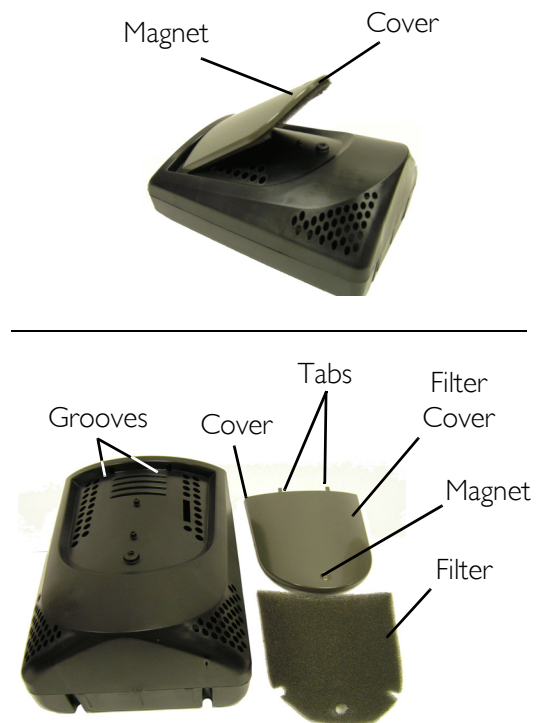
## Replacing the Gross Particle Filter or Filter Cover

*NOTE: For this procedure, refer to FIGURE 2.1.*

*NOTE: The gross particle filter should be cleaned or replaced according to the Preventive Maintenance Record on page 18.*

1. Lift filter cover slightly and pull down to remove tabs from the grooves.
2. Lift out the filter from the filter cover.
3. Use a vacuum cleaner or wash with a mild liquid dish detergent (such as Dawn™) and water. Rinse thoroughly.
4. Thoroughly dry the filter and inspect for fraying, crumbling, tears and holes.
5. Replace filter cover and/or filter.
6. Reinstall the filter cover by placing the tabs in the slots and engaging the magnet.

*NOTE: Use only Invacare gross particle filter.*



**FIGURE 2.1** Replacing the Gross Particle Filter or Filter Cover

## Accessing XPO<sub>2</sub>

## ⚠ WARNING

When accessing the XPO<sub>2</sub> remember that battery power is still being applied to the internal (PCB) printed circuit board. Care **MUST** be taken to minimize contact with the PCB. **DO NOT** use any kind of tool (screwdriver, pliers, etc.) when working on the internal structure, otherwise, injury and/or damage may occur. Battery power remains on the PCB as long as the battery connection is made to the PCB.

*NOTE: For this procedure, refer to FIGURE 2.2 and FIGURE 2.3 on page 10.*

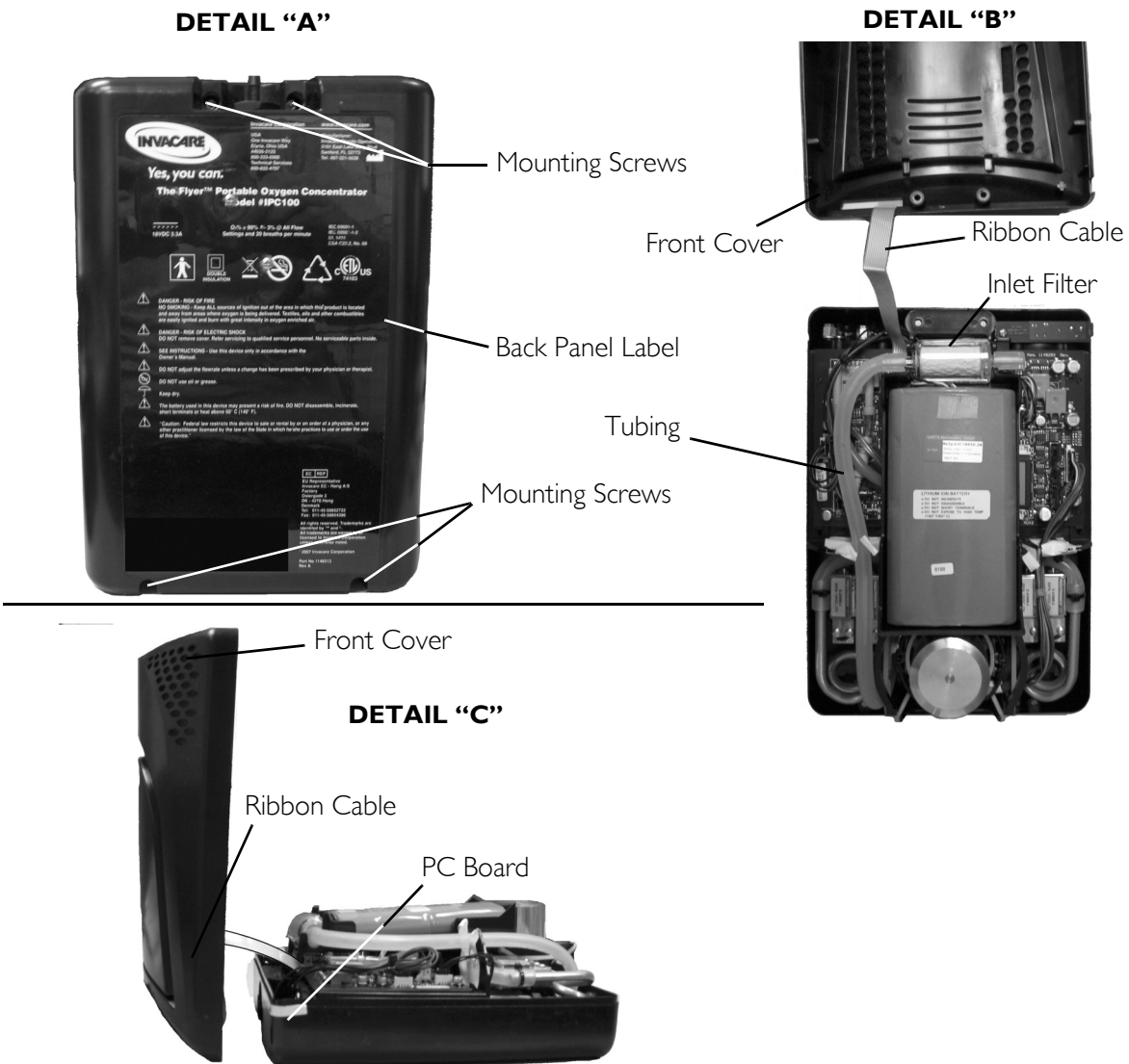
1. Remove label from the top of the XPO<sub>2</sub> (FIGURE 2.2).

*NOTE: This label adheres to the front and rear sections of the XPO<sub>2</sub>. This label MUST be removed to separate the two sections.*



**FIGURE 2.2** Remove/Install label

2. Position the XPO<sub>2</sub> so that the back panel label is facing up (Detail “A” in FIGURE 2.3).
3. Remove the four mounting screws from the back of the XPO<sub>2</sub> using a T15 Torx<sup>®</sup> screwdriver (Detail “A” in FIGURE 2.3).



**FIGURE 2.3** Removing the Front Cover

4. While holding the unit together rotate the XPO<sub>2</sub> and position it so that the back panel label is facing down.

*NOTE:* The ribbon cable is connected to the front cover and the pc board. Only open the XPO<sub>2</sub> as shown in Details “B” and “C”.

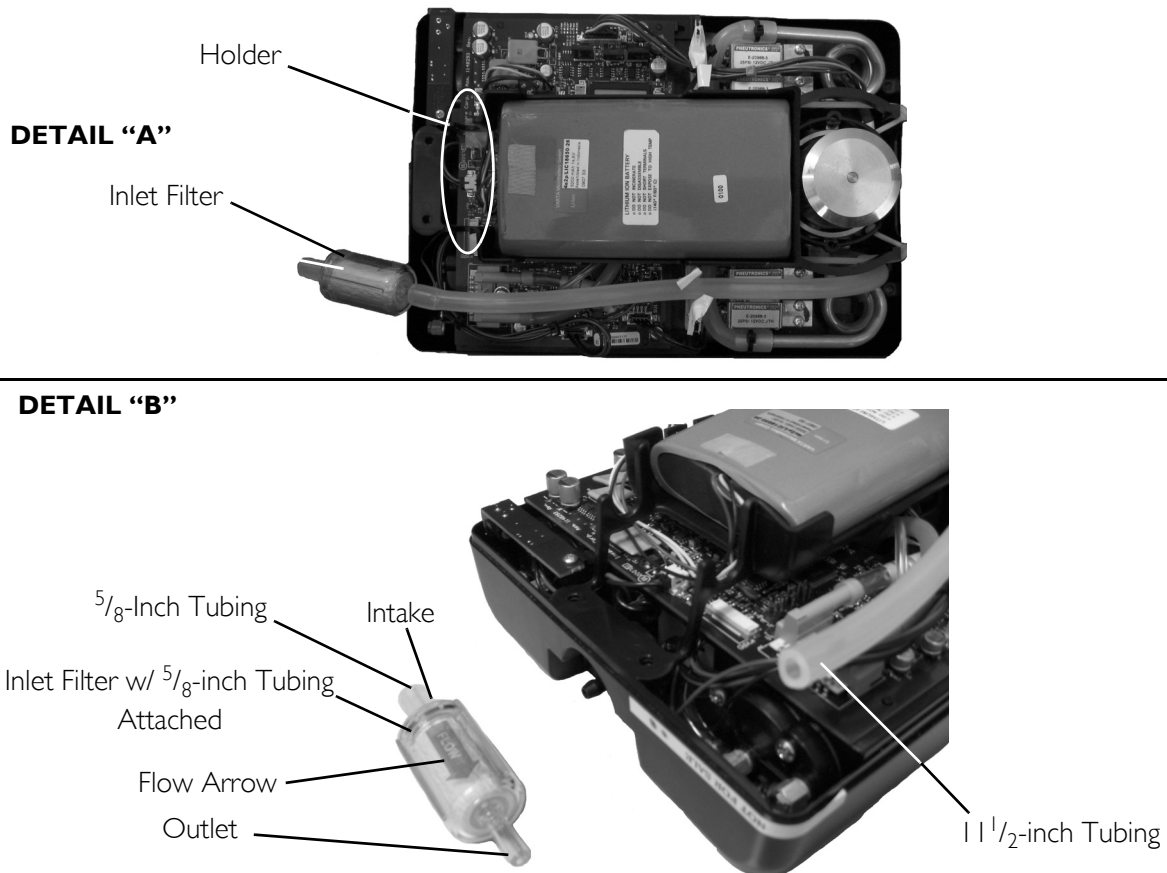
5. Slowly, open the front cover ensuring not to damage the ribbon cable (Detail “B” and Detail “C” in FIGURE 2.3).

## Replacing the Inlet Filter

*NOTE:* For this procedure, refer to FIGURE 2.4 and FIGURE 2.2 on page 10.

*NOTE:* The inlet filter should be replaced according to the Preventive Maintenance Record on page 18.

1. Perform the steps in Accessing XPO<sub>2</sub> on page 9.
2. Remove the inlet filter from the holder (Detail “A”).
3. Disconnect the inlet filter with  $\frac{5}{8}$ -inch tubing attached from the  $1\frac{1}{2}$ -inch long tubing (Detail “B”).



**FIGURE 2.4** Replacing the Inlet Filter

4. Transfer the  $\frac{5}{8}$ -inch tubing to the intake of the new filter.

*NOTE: The flow arrow points away from the intake.*

5. Connect the 11½-inch tubing to the outlet of the inlet filter (Detail “A” of FIGURE 2.4).
6. Position and orient the new filter in the holder (Detail “B” of FIGURE 2.3).
7. Re-assemble the XPO<sub>2</sub>. Refer to Re-assembling the XPO<sub>2</sub> on page 13.

## Replacing the Battery

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### CAUTION

Before handling the P.C. board, ensure you are properly grounded to prevent static damage to the components of the board. A static cuff **MUST** be worn and properly grounded using an alligator clip. Electrical conduit or a water pipe is normally sufficient when a known good ground is unavailable. Care should be taken to ensure that the alligator clip contacts a bare metal surface.

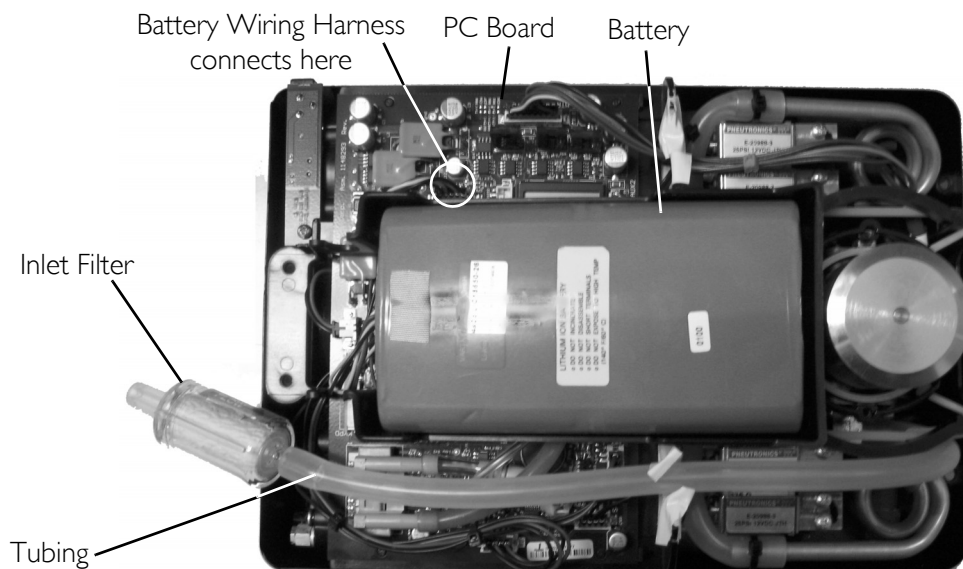
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*NOTE: For this procedure, refer to FIGURE 2.5.*

*NOTE: The battery should be replaced as required.*

1. Perform the steps in Accessing XPO<sub>2</sub> on page 9.
2. Remove the inlet filter with tubing attached from the holder.
3. Disconnect the battery wiring harness from the PC board.
4. Remove the battery from the thermal pad and battery tray.

*NOTE: The thermal pad is between the battery and the bottom of the tray. It is a soft “dough-like” material that adheres to the tray. If thermal pad is damaged or pulled up during battery removal it **MUST** be replaced.*



**FIGURE 2.5** Replacing the Battery

*NOTE: When installing new battery, ensure the battery is label side up.*

5. Position new battery on thermal pad as shown.
6. Connect the battery wiring harness to the PC board.
7. Install inlet filter with tubing into holder.
8. Re-assemble the XPO<sub>2</sub>. Refer to Re-assembling the XPO<sub>2</sub> on page 13.

## **Re-assembling the XPO<sub>2</sub>**

*NOTE: For this procedure, refer to FIGURE 2.3 on page 10.*

1. Carefully, re-install the front cover onto the XPO<sub>2</sub>.
2. Turn the XPO<sub>2</sub> On to ensure proper operation.
3. Turn XPO<sub>2</sub> Off.
4. While holding the unit together, position the XPO<sub>2</sub> so that the back panel is facing up (Detail "A" in FIGURE 2.3).
5. Install four mounting screws and secure the two sections of the XPO<sub>2</sub> together (Detail "A" in FIGURE 2.3). Securely tighten.
6. Remove the glue residue by applying 91% isopropyl alcohol, and wiping with a clean cloth. Make sure the surface is dry and free of any residue. This will ensure a good seal for the new label.
7. Install replacement label on the top of the XPO<sub>2</sub> so that it adheres to both the front and rear sections. Refer to Remove/Install label on page 10.

## **Replacement Parts**

*NOTE: Refer to the parts catalog at [www.invacare.com](http://www.invacare.com) for component part number.*

## SECTION 3—CHECKING O<sub>2</sub> PURITY

*NOTE: Although the XPO<sub>2</sub> offers pulse dose only, the oxygen purity can be checked with a hand held oxygen analyzer.*

*NOTE: Oxygen purity should be checked annually or every 4,320 hours, whichever comes first. Refer to Preventive Maintenance Record on page 18.*

1. Turn the unit On.
2. Press the “+” button to increase the flow to setting 5.
3. Simultaneously press and hold the “+” and “battery gauge” buttons until the #5 BLUE indicator light blinks. This is your indication that the unit is now in auto-pulse mode.

*NOTE: The unit will remain in auto-pulse mode until it is set to a lower flow setting or is turned off.*

4. Connect a standard hand held oxygen analyzer to the outlet port.
5. Follow the directions provided by the analyzer manufacturer. Some analyzers will also measure flow and pressure, but only if connected to a continuous flow of oxygen (so these options are not usable on this pulse only unit).

*NOTE: The purity reading may fluctuate slightly due to the pulse flow. It is recommended that you record a high and a low over a 60 second time period. The XPO<sub>2</sub> is functioning properly when the purity levels are above 87%, after the 5 minute warm-up period.*

# SECTION 4—TROUBLESHOOTING AND MAINTENANCE

## Troubleshooting

The XPO<sub>2</sub> has dozens of alarms that are being monitored on a continuous basis. The alarms are grouped into four main categories:

- **Common Alarms:** These are alarms for which the patient, or the provider, can take action to eliminate the issue. These alarms, and the corrective steps, are fully explained within the Owner's Manual (OM).
- **Operating Alarms:** This alarm group centers on the sieve beds and the PSA process. These are alarms for which there is no corrective action available to either the patient or the provider. However, there are sub-codes that can be accessed to help the Invacare service and repair centers.
- **Compressor Alarms:** This alarm group centers on the compressor operation. These are alarms for which there is no corrective action available to either the patient or the provider. However, there are sub-codes that can be accessed to help the Invacare service and repair centers.
- **System Alarms:** This alarm group centers on internal software monitors. These are alarms for which there is no corrective action available to either the patient or the provider (\*). However, there are sub-codes that can be accessed to help the Invacare service and repair centers.

To access the Sub-Alarm codes, the unit first has to be in an alarm condition with multiple flow level LEDs illuminated. While in this condition, the Plus (+) and Minus (-) flow setting buttons should be pushed and held. As long as both these buttons are being pushed, a different set of flow LEDs will illuminate. This alternate set of illuminated LEDs is the sub-alarm code. Once the Plus and Minus buttons are released, the original alarm code will return. Once the unit is turned off, the alarm codes displays will be reset. All the alarms should be reset and the unit turned back on to see if the unit can self-correct the problem. If the alarms persist, please contact your nearest Invacare repair center.

## Error Codes

ERROR / ERROR CODE	ALARM (Illuminated flow LEDs)	SUB-ALARM (Illuminated flow LEDs)
<b>Common Alarms</b>		
Internal temperature of the unit is either too hot, or too cold, to allow compressor to start. See OM for instructions.	1, 2	None
While operating, the internal temperature of the unit becomes either too hot, or too cold, to allow operation to continue. See OM for instructions.	1, 3	None
The internal battery temperature is either too hot, or too cold, to allow operation on battery to continue. See OM for instructions.	1, 4	None
Control panel button was found to be continuously pressed upon power-up (a.k.a. stuck button). See OM for instructions.	1, 5	None
<b>Operating Alarms</b>		
Code: 3000	3, 4	None
Code: 3001	3, 4	1
Code: 3002	3, 4	2
<b>Compressor Alarms</b>		
Code: 6000	4, 5	None
Code: 6001	4, 5	1
Code: 6002	4, 5	2
Code: 6003	4, 5	1,2

(\*) Within the System Alarms there are a few alarms that *may* correct themselves simply by changing the internal battery.

ERROR/ ERROR CODE	ALARM (Illuminated flow LEDs)	SUB-ALARM (Illuminated flow LEDs)	COMMENTS
<b>System Alarms</b>			
Code: 7000	3, 4, 5	None	
Code: 7001	3, 4, 5	1	
Code: 7002	3, 4, 5	2	Replacement of the internal battery may eliminate this problem
Code: 7003	3, 4, 5	1,2	
Code: 7004	3, 4, 5	3	
Code: 7005	3, 4, 5	3,1	
Code: 7006	3, 4, 5	3,2	
Code: 7007	3, 4, 5	3,2,1	
Code: 7008	3, 4, 5	4	
Code: 7009	3, 4, 5	4,1	
Code: 700a	3, 4, 5	4,2	
Code: 700b	3, 4, 5	4,2,1	
Code: 700c	3, 4, 5	4,3	
Code: 700d	3, 4, 5	4,3,1	
Code: 700e	3, 4, 5	4,3,2	Replacement of the internal battery may eliminate this problem



SECTION 4—TROUBLESHOOTING AND MAINTENANCE

Code: 700f	3, 4, 5	4,3,2,1	Replacement of the internal battery may eliminate this problem
Code: 7010	3, 4, 5	5	Replacement of the internal battery may eliminate this problem
Code: 7011	3, 4, 5	5,1	
Code: 7012	3, 4, 5	5,2	
Code: 7013	3, 4, 5	5,2,1	
Code: 7014	3, 4, 5	5,3	
Code: 7015	3, 4, 5	5,3,1	
Code: 7016	3, 4, 5	5,3,2	
Code: 7017	3, 4, 5	5,3,2,1	
Code: 7018	3, 4, 5	5,4	
Code: 7019	3, 4, 5	5,4,1	
Code: 701a	3, 4, 5	5,4,2	
Code: 701b	3, 4, 5	5,4,2,1	
Code: 701c	3, 4, 5	5,4,3	
Code: 701d	3, 4, 5	5,4,3,1	Replacement of the internal battery may eliminate this problem
Code: 701e	3, 4, 5	5,4,3,2	
Code: 701f	3, 4, 5	5,4,3,2,1	

## Preventive Maintenance Record

Model No. \_\_\_\_\_ Serial No. \_\_\_\_\_

On Each Inspection

Record Date Of Service						
Clean equipment surface per Cleaning, Care and Maintenance instructions*						
Inspect XPO <sub>2</sub> cabinet and accessories for damage**						
Check for presence and legibility of all labels						
<b>Annually, During Preventive Maintenance Schedule, Or Between Patients</b>						
Replace Patient Cannula						
Clean or Replace Gross Particle Filter*						
Replace Inlet Filter*						
Function Test (Refer to Function Test on page 19)						
<b>Every 4,320 Hours Of Operation</b>						
Check Oxygen Purity*						
<b>As Required</b>						
Replace Internal Battery*						

\*NOTE: Refer to appropriate section of the Service or Owner's Manual for this procedure.

\*\*NOTE: If damage is found, return unit to Invacare for repair.

## Function Test

1. Connect XPO<sub>2</sub> to AC power source.
2. Check that the internal battery charging indicator operates as defined by the XPO<sub>2</sub> owner's manual.
3. Turn the XPO<sub>2</sub> on by pressing the "ON/OFF" button for approximately one second. Each time the XPO<sub>2</sub> is turned on, a brief alarm will sound and all front panel LED's will illuminate briefly. The XPO<sub>2</sub> pulse flow setting will be the same flow setting selected the last time the unit was turned off.
4. After approximately sixty seconds of operation the "No Breath Detected" alarm will sound.
5. Verify that the "No Breath Detected" alarm is operating as defined by the XPO<sub>2</sub> owner's manual.
6. Connect an oxygen cannula to the XPO<sub>2</sub>.
7. Breathe with the cannula to ensure the XPO<sub>2</sub> pulses at each setting. Change setting as required.
8. Check the oxygen purity using a hand held analyzer. Refer to [Checking O2 Purity](#) on page 14.
9. Use the flow selection (-) button to select setting "2".
10. Turn unit off to complete test.

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# LIMITED WARRANTY

For warranty information, please refer to the original owner's manual which came with this product, or contact Invacare for more information.



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**Invacare Corporation** [www.invacare.com](http://www.invacare.com)

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