

# MaxBlend2

## Technical Service Manual

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# Introduction

## NOTICE

Repair of this equipment must be performed by a qualified service technician. The MaxBlend2 series of products has been designed for maximum reliability, stable performance and low maintenance. Only use genuine replacement parts to ensure proper device operation and performance.

Products in need of factory repair may be sent to:

Maxtec  
Customer Service Department  
2305 S. 1070 W.  
Salt Lake City, Utah 84119 USA  
(Include RMA number)  
Maxtec Customer Service Line: 1-800-748-5355

## HOW TO USE THIS MANUAL

This manual provides service technicians with information needed to maintain and service the MaxBlend2 series of products. Illustrations are given for reference purposes only and some components may not be shown for clarity. The procedures described herein are for service of assemblies that are considered field-replaceable. For all other required service or repair please contact an authorized service representative.

## GENERAL TROUBLESHOOTING GUIDELINES

Troubleshooting the MaxBlend2 series of products should always begin by assessing the problem with the user who experienced the trouble. This may eliminate unnecessary troubleshooting. Once a general problem has been identified, refer to the trouble shooting guidelines in the IFU to determine the proper corrective action. After servicing any component, verify that the unit is operating properly before placing back into service. Refer to the IFU for performance testing procedures.

## CAUTION

The MaxBlend2 contains electronic components that are susceptible to damage by electrostatic discharge (ESD). When disassembling the device, work at a static controlled workstation; wear a static-control wrist strap to discharge accumulated static charges from you and any tool you are using. Handle the circuit board by the edges and use antistatic containers for transporting circuit boards. Some screws in the unit may appear to be similar in size but have different threads. To prevent potential damage to unit(s) when servicing, keep components together to ensure they are returned to their original unit.

## Recommended Maintenance Schedule

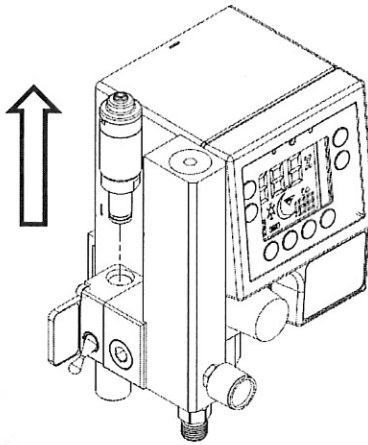
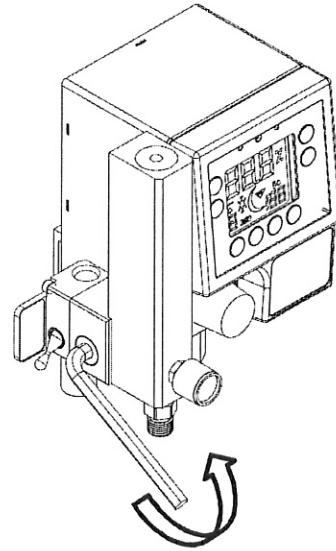
Component	Interval
Blender Core Rebuild	Every 3 years
Bleed Muffler Elements	Every 3 years
Flowmeter	None required
Bleed Toggle Switch	None required

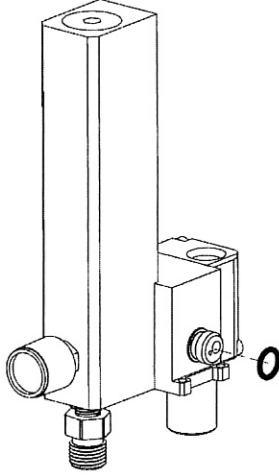
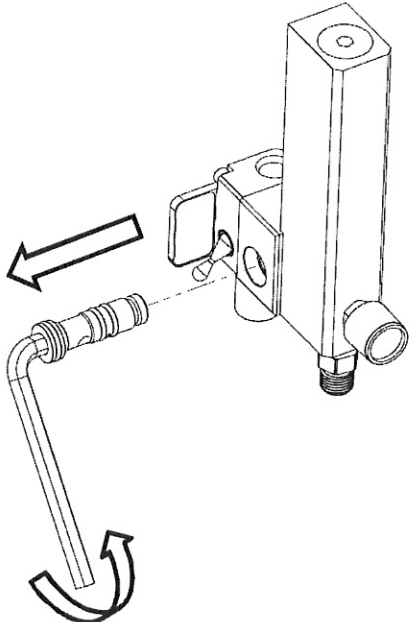
## Service Tools

Tool	Size
Allen wrench	5/16"
Allen wrench	5/32"
Flat head screwdriver	≤ 1/8"
Phillips screwdriver	PH1
Torx driver	T10

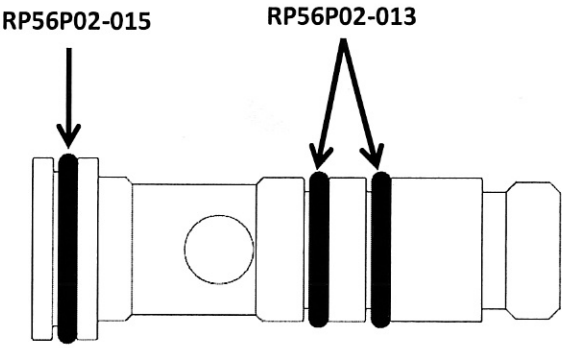
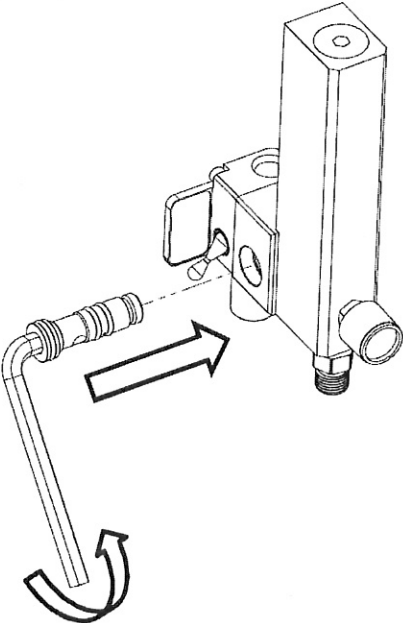


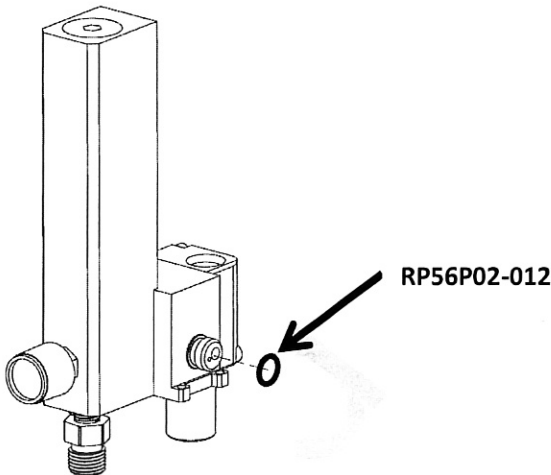
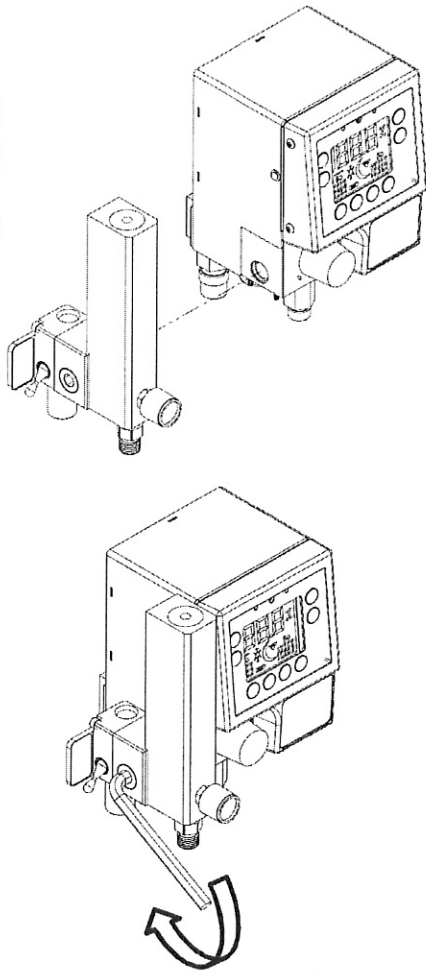
## Flowmeter Manifold Removal

Step	Procedure	
1	Remove the oxygen sensor cable and oxygen sensor.	
2	Using a 5/16" Allen wrench, unscrew the manifold bolt (counterclockwise) until the flowmeter manifold releases from the blender. Use caution when separating the flowmeter manifold from the blender.	

3	Remove and discard the O-ring from the tip of the flowmeter manifold bolt.	
4	Rotate the manifold bolt back and forth as you remove it from the manifold block.	

## Flowmeter Manifold Installation

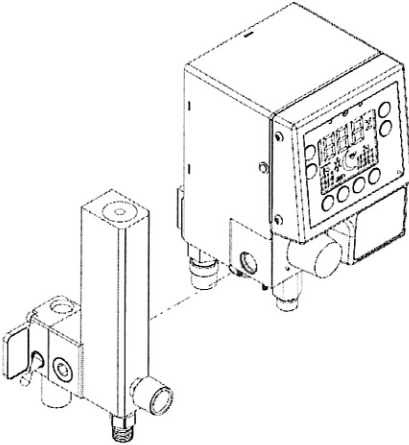
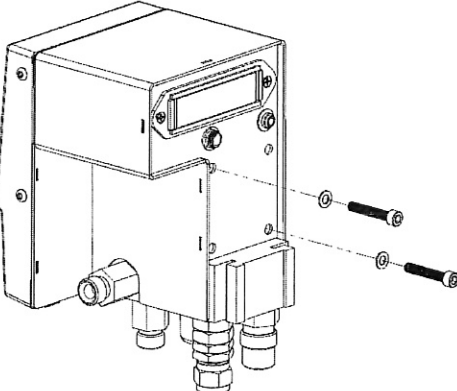
Step	Procedure	
1	<p>Replace the O-rings on the flowmeter manifold bolt into the locations as shown. Lightly lubricate each O-ring with O-ring lubricant, RP24P02.</p>	 <p>The diagram shows a side view of a manifold bolt. Three O-ring locations are indicated by black vertical bars. The leftmost location is labeled RP56P02-015 with a single arrow. The two locations to its right are labeled RP56P02-013 with a double arrow.</p>
2	<p>Rotate the manifold bolt slowly back and forth as you re-install it into the manifold block. The head of the bolt should be flush with the block surface.</p> <p><b>Note:</b> Use caution to avoid tearing or cutting the O-rings.</p>	 <p>The diagram shows a 3D perspective view of a manifold block with a bolt being inserted. A curved arrow indicates the rotation of the bolt. A straight arrow points towards the bolt head, indicating the direction of insertion.</p>

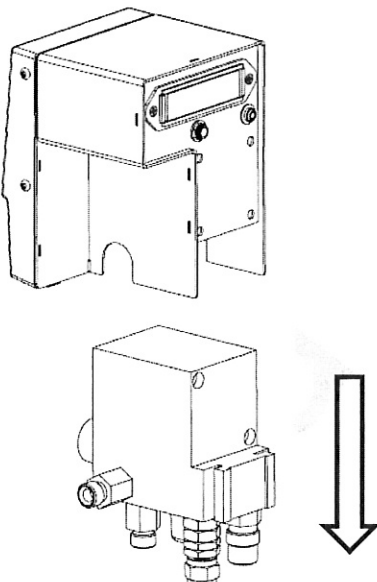
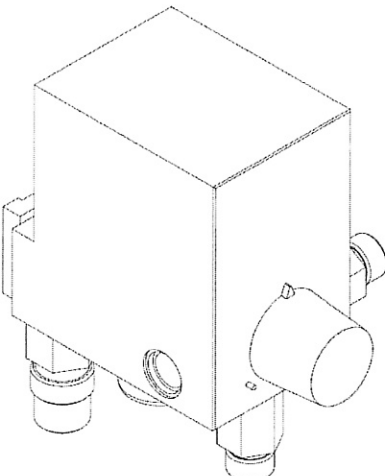
3	<p>Install a new lightly lubricated O-ring (RP56P02-012) onto the tip of the flowmeter manifold bolt.</p>	 <p>The diagram shows a vertical flowmeter manifold with a bolt at the bottom. An O-ring, labeled RP56P02-012, is being placed onto the tip of the bolt. An arrow points from the label to the O-ring.</p>
4	<p>Using a 5/16" Allen wrench, tighten (clockwise) the manifold bolt to the left side blender port to 100 in-lbs. Ensure the flowmeter manifold is flush with the blender core.</p> <p><b>Note:</b> Use caution to ensure the bolt is aligned in the blender port to avoid stripping the threads.</p>	 <p>The diagram shows two views of the flowmeter manifold being attached to a blender. The top view shows the manifold being aligned with the blender port. The bottom view shows the manifold being tightened to the blender port, with a curved arrow indicating the direction of rotation.</p>

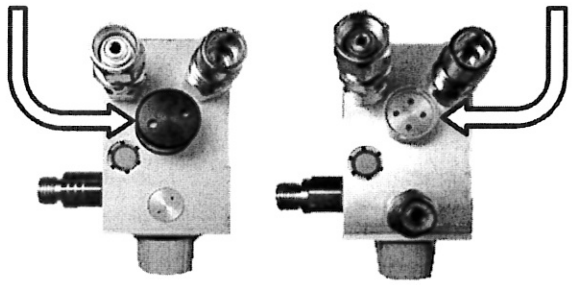
## Bleed Muffler Replacement

Step	Procedure
1	<p>With a small flathead screwdriver, carefully pry out the star retainer from the bottom of the bleed block and discard. Remove the three (3) foam elements inside and discard.</p>
2	<p>Insert three (3) new foam muffler elements and press the new star retainer into place.</p> <p><b>Note:</b> Be sure to properly orient the star retainer as shown.</p> <div data-bbox="747 441 1299 1701"> <p>Star retainer →</p> <p>Foam muffler elements →</p> <p>Bottom of bleed block →</p> </div>

## Blender Core Removal

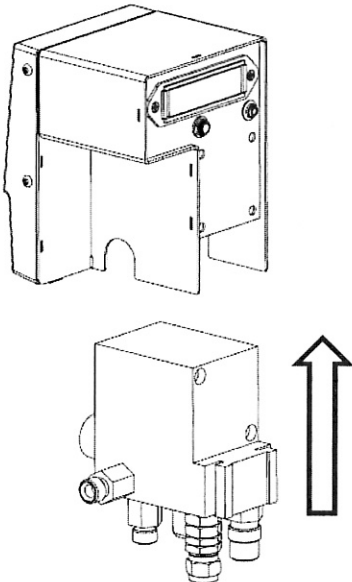
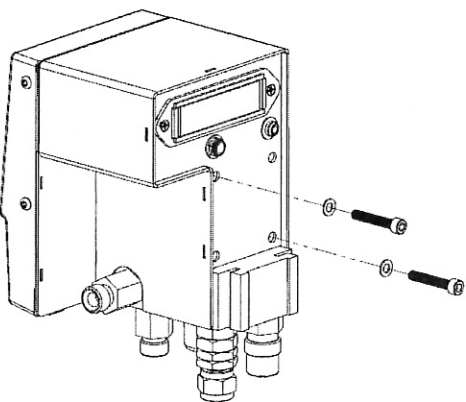
Step	Procedure
1	<p data-bbox="305 384 560 562">Remove the flowmeter manifold according to Flowmeter Manifold Removal.</p> 
2	<p data-bbox="305 930 560 1245">With a 5/32" Allen wrench, remove the two socket cap screws and washers from the rear of the device. Note the position of the screws before removing.</p> <p data-bbox="305 1287 560 1539"><b>Note:</b> Screws may be in alternate orientation as shown and length will vary between Bird™ and Bio-Med Devices blender cores.</p> 

3	<p>Carefully remove the blender from the monitor enclosure.</p>	
4	<p>The blender core may now be serviced according to the manufacturers' instructions. Refer to image shown for blender core identification.</p> <p>For Bird™ blender cores, refer to latest revision of Bird™ Low Flow/High Flow Microblender Service Manual.</p> <p>For Bio-Med Devices (BMD) blender cores, refer to latest revision of BMD Air/Oxygen Blender Service Manual Models 2001 (High</p>	

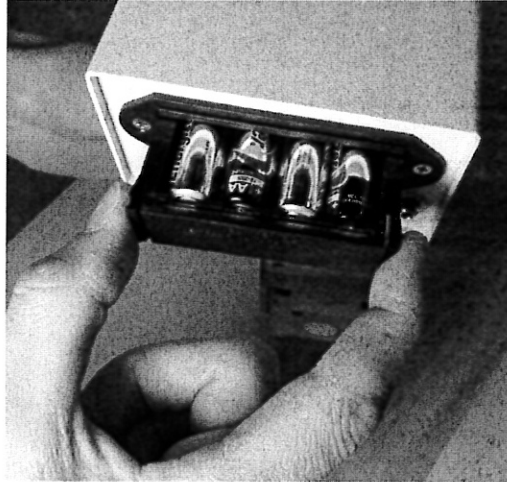
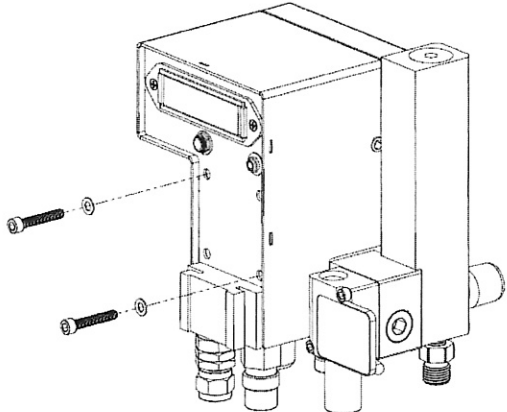
<p>Flow), 2003 (Low Flow).</p> <p>Contact Maxtec service department for further details.</p> <p><b>Note:</b> A complete blender core rebuild is recommended every three years.</p>	<div data-bbox="657 283 889 352"><p>Bird™ blender Plastic (Black or Gray)</p></div> <div data-bbox="1015 283 1274 352"><p>Bio-Med Devices blender Metal (Silver)</p></div> <div data-bbox="690 357 1258 640"></div>
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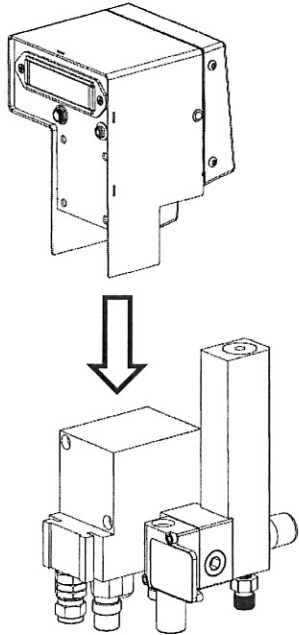
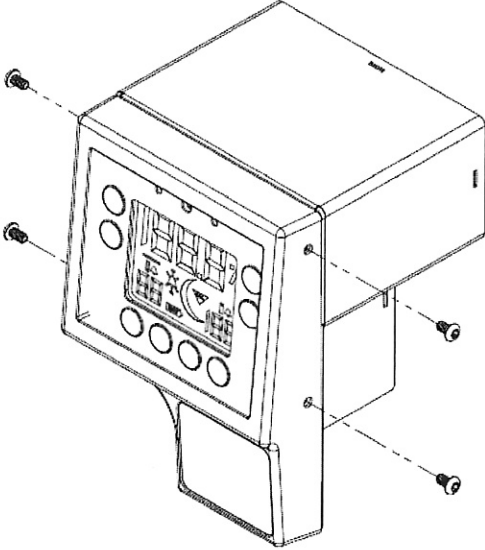


## Blender Core Installation

Step	Procedure	
1	<p>Carefully slide the blender core into the monitor enclosure.</p> <p><b>Note:</b> Use caution not to pinch any wires inside the enclosure.</p>	
2	<p>With a 5/32" Allen wrench, install the two socket cap screws and washers into the rear of the device and firmly tighten. It is helpful to start both screws before fully tightening.</p> <p><b>Note:</b> Screws may be in alternate orientation as shown and length will vary between Bird™ and Bio-Med Devices blender cores.</p>	

## Front Bezel Assembly Removal

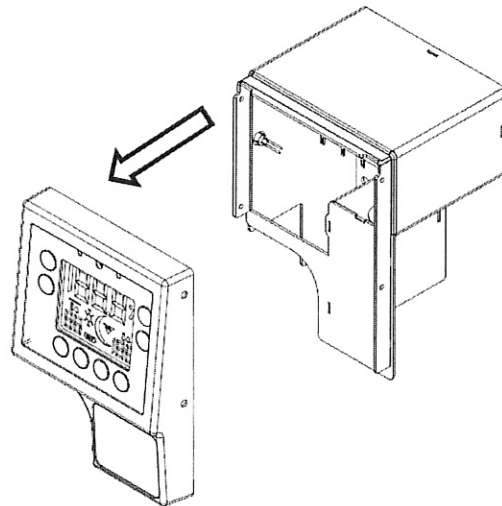
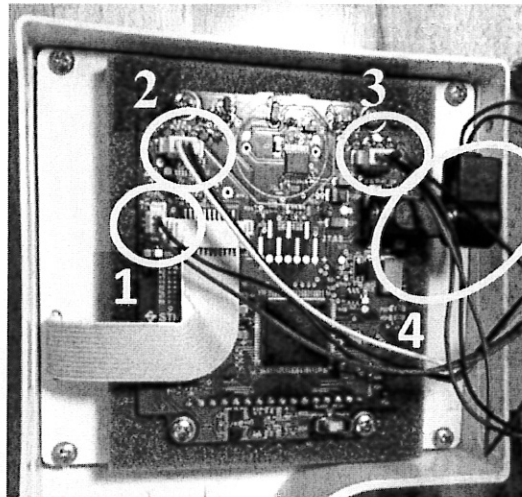
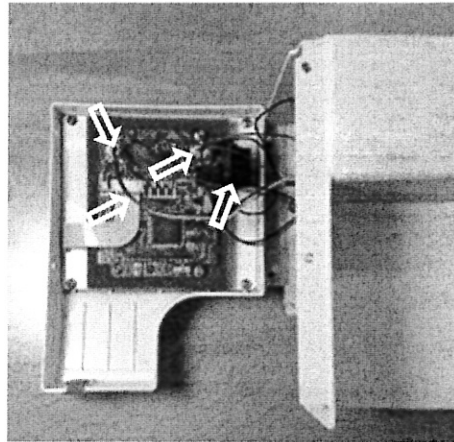
Step	Procedure	
1	Remove the batteries from the unit.	
2	<p>With a 5/32" Allen wrench, remove the two socket cap screws and washers from the rear of the device. Note the position of the screws before removing.</p> <p><b>Note:</b> Screws may be in alternate orientation as shown and length will vary between Bird™ and Bio-Med Devices blender cores.</p>	

<p>3</p>	<p>Carefully slide the flowmeter and blender core assembly from the monitor enclosure.</p>	
<p>3</p>	<p>Remove the front bezel screws using a T10 Torx driver.</p>	

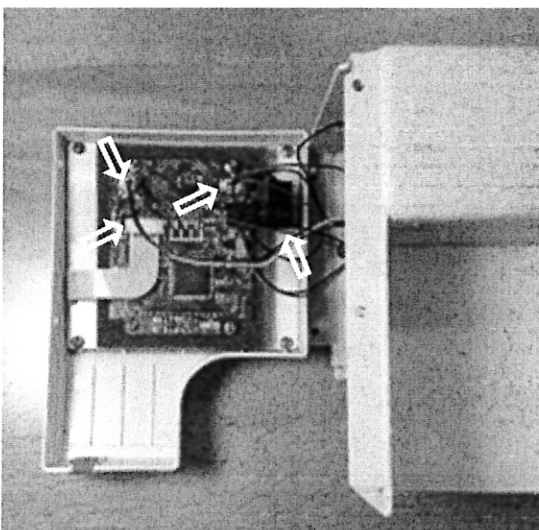
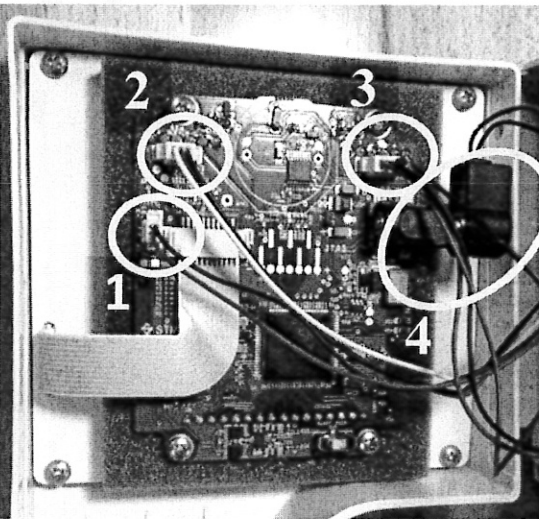
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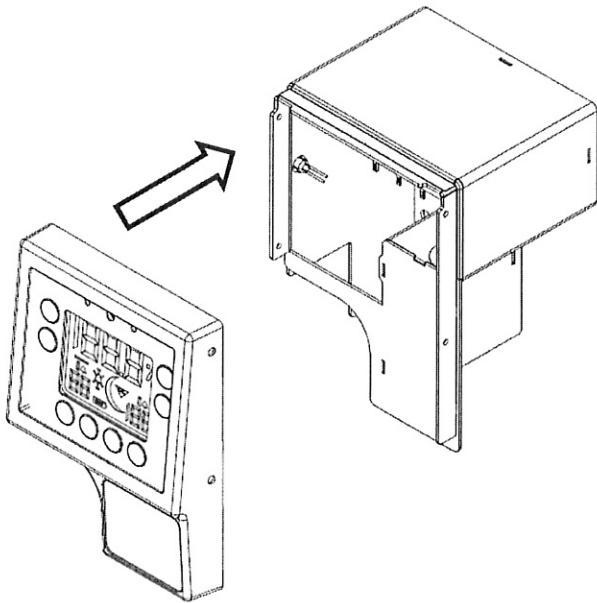
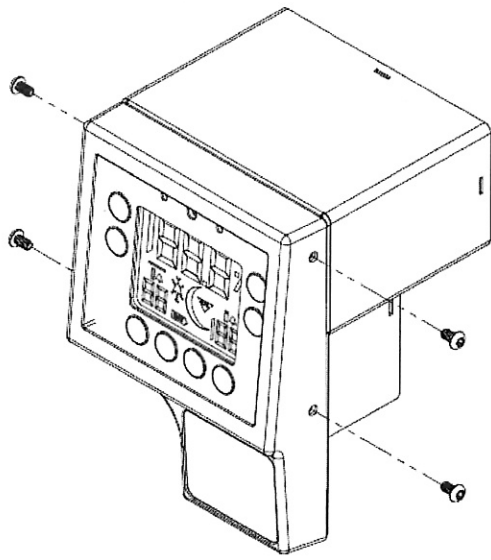
Gently remove the bezel from the enclosure making sure not to stretch any of the wire assemblies. Disconnect the four (4) cable assemblies from the PCBA as shown.

**Note:** Use caution when laying enclosure on its side so not to damage LED or LED retaining clip.

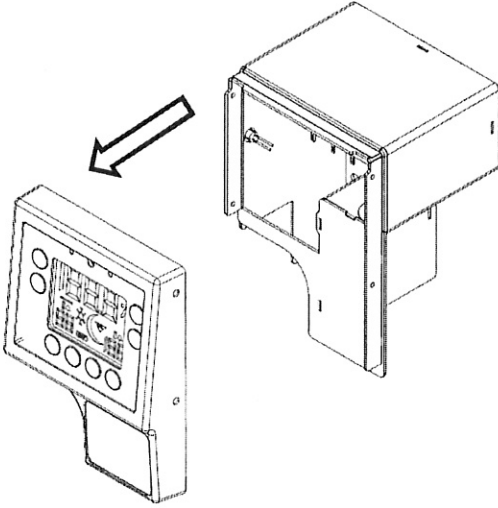
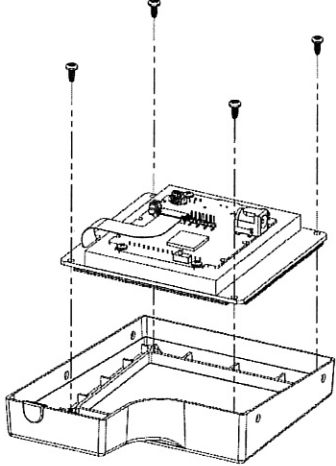


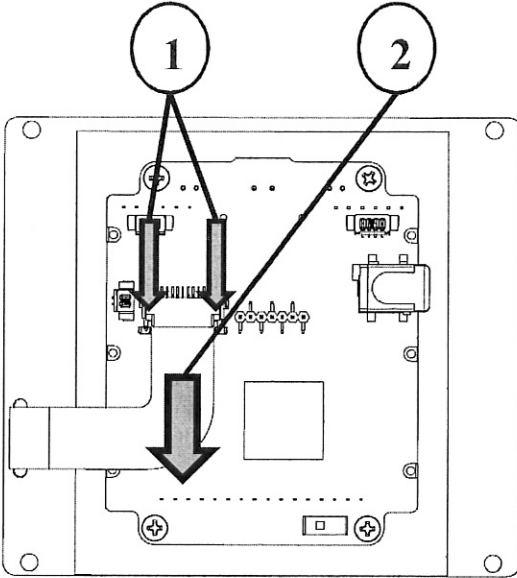
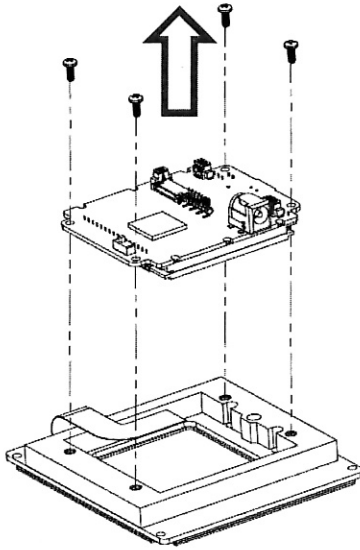
## Front Bezel Assembly Installation

Step	Procedure
1	<p data-bbox="305 394 641 682">Attach all four (4) cable assemblies to the PCBA as shown and slide the front Bezel onto the case. If you are installing a new front Bezel assembly be sure to replace the rubber plug at the base of the Bezel.</p> <p data-bbox="305 724 641 934"><b>Note:</b> Be sure to orient the plugs correctly and observe the number of pins in each connection. Use caution not to pinch any wires between the case and the Bezel.</p> <div data-bbox="755 441 1291 966"></div> <div data-bbox="755 1039 1291 1554"></div>

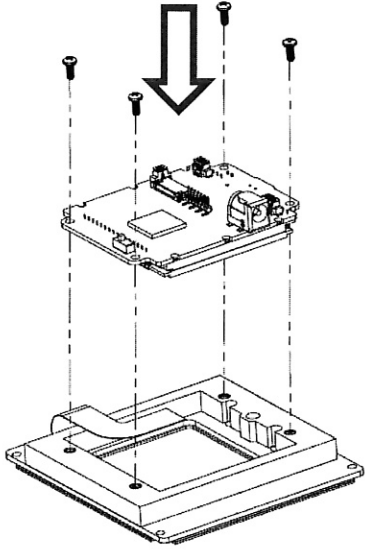
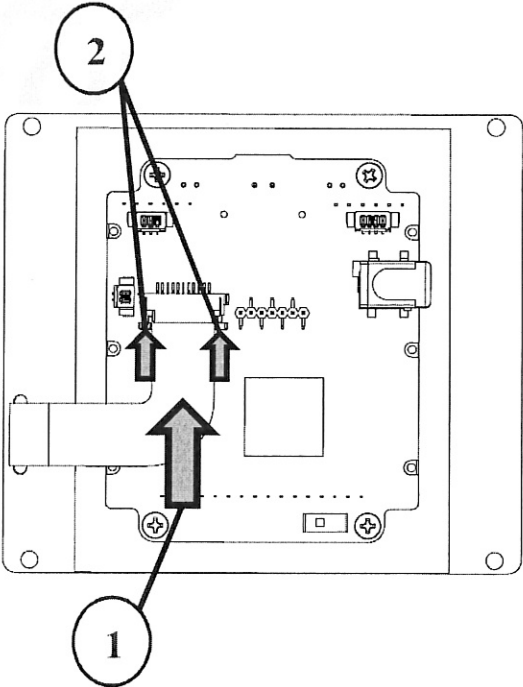
		 <p>A line drawing showing a front bezel with a control panel on the left and a main rectangular unit on the right. A large arrow points from the bezel towards the unit, indicating it is to be attached.</p>
3	Attach the front bezel screws using a T10 Torx driver.	 <p>A line drawing of the main unit with the bezel attached. Four screws are shown being inserted into the bezel, indicated by dashed lines and arrows. The screws are located at the top-left, top-right, bottom-left, and bottom-right corners of the bezel.</p>

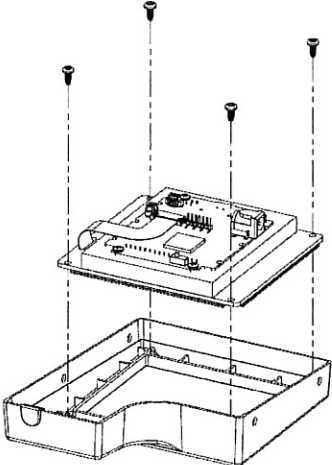
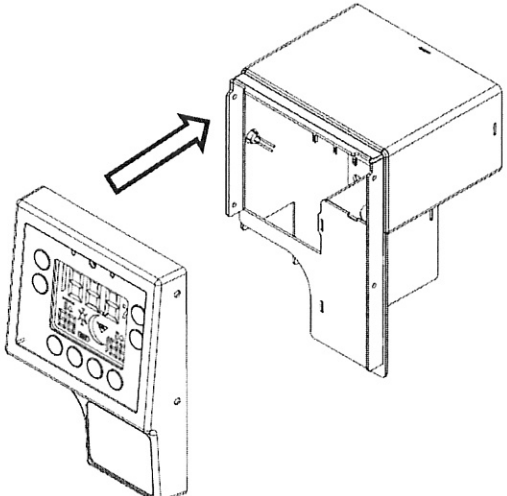
## Keypad/Bezel Assembly Replacement

Step	Procedure
1	<p>Remove the front bezel assembly according to Front Bezel Assembly Removal.</p> 
2	<p>Remove the four (4) Philips screws as shown and remove the keypad assembly as shown.</p> <p><b>Note:</b> If you are only replacing the plastic front bezel, install the keypad assembly into the new bezel as shown in step 7 and replace the rubber plug at the base of the Bezel.</p> 

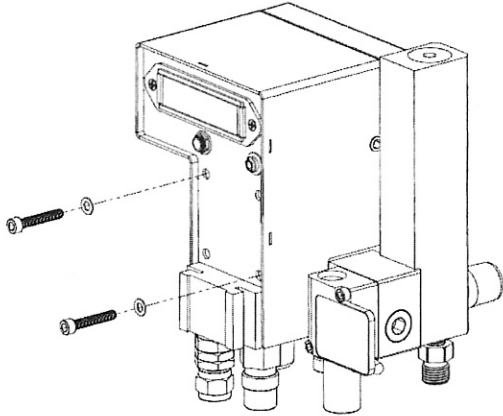
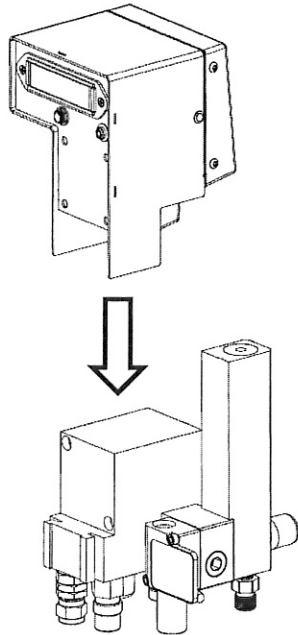
3	<p>Disconnect the ribbon cable from the PCBA by first sliding down both locking tabs and then gently removing the ribbon cable from the connector.</p>	
4	<p>Remove the four (4) Philips screws and gently lift out the PCBA.</p>	



5	<p>Re-install the PCBA into the new keypad assembly and install with the four (4) new Philips screws (P/N RP06P60) as shown.</p> <p><b>Note:</b> Early product versions were supplied with a different screw thread. Be sure to use the new supplied screws to mount the PCBA.</p>	 A perspective view diagram showing a keypad assembly at the bottom and a PCBA (Printed Circuit Board Assembly) being lowered into it. Four dashed vertical lines indicate the positions of screws. A large downward-pointing arrow is positioned above the PCBA, indicating the direction of assembly.
6	<p>Reconnect the ribbon cable by first inserting the ribbon cable fully into the connector and then locking both tabs simultaneously.</p> <p><b>Note:</b> Ensure that the ribbon cable is straight and properly aligned in the connector after locking into place.</p>	 A top-down view diagram of the keypad assembly's internal components. A ribbon cable is shown being inserted into a connector. Two arrows point to the locking tabs on the connector. A large upward-pointing arrow indicates the direction of assembly. The number '2' is in a circle next to the top arrow, and the number '1' is in a circle next to the bottom arrow.

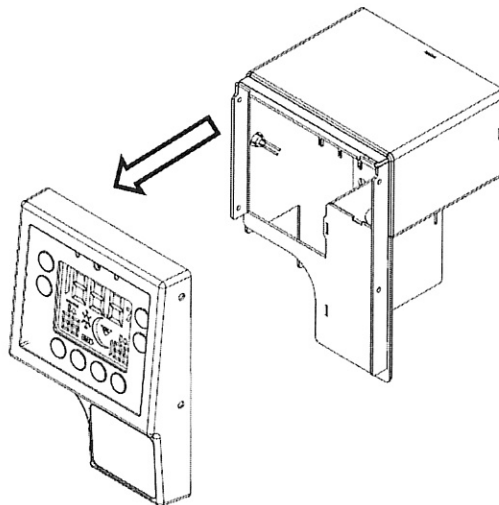
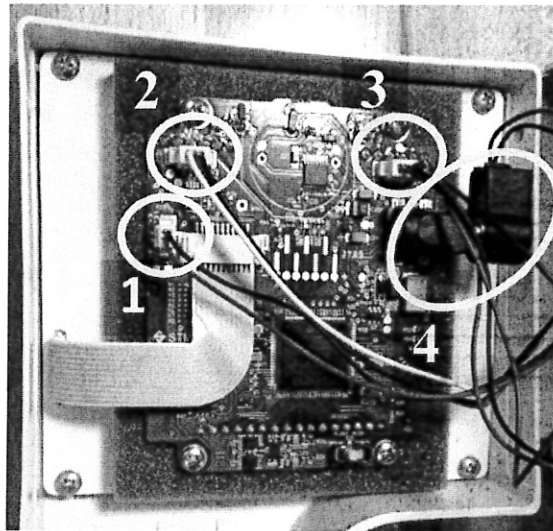
7	<p>Install the keypad back into the bezel and tighten the self-tapping screws down uniformly to ensure proper sealing of the gasket.</p> <p><b>Note:</b> Use caution not to strip the threads in the bezel.</p>	 A technical line drawing showing a keypad assembly being inserted into a rectangular bezel. Four self-tapping screws are shown with dashed lines indicating their path into the bezel to secure the keypad. The keypad has a grid of buttons and some electronic components visible on its surface.
8	<p>Reattach the front Bezel assembly according to Front Bezel Assembly Installation.</p>	 A technical line drawing showing two components. On the left is a front bezel assembly with a keypad and a small display. On the right is a larger rectangular main unit. A large arrow points from the bezel assembly towards the main unit, indicating the direction of reattachment. The main unit has a recessed area where the bezel would fit.


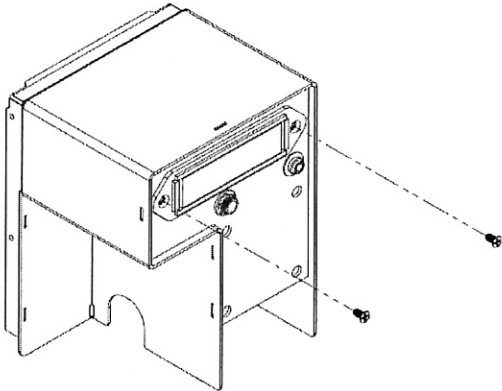
## Battery Drawer Replacement

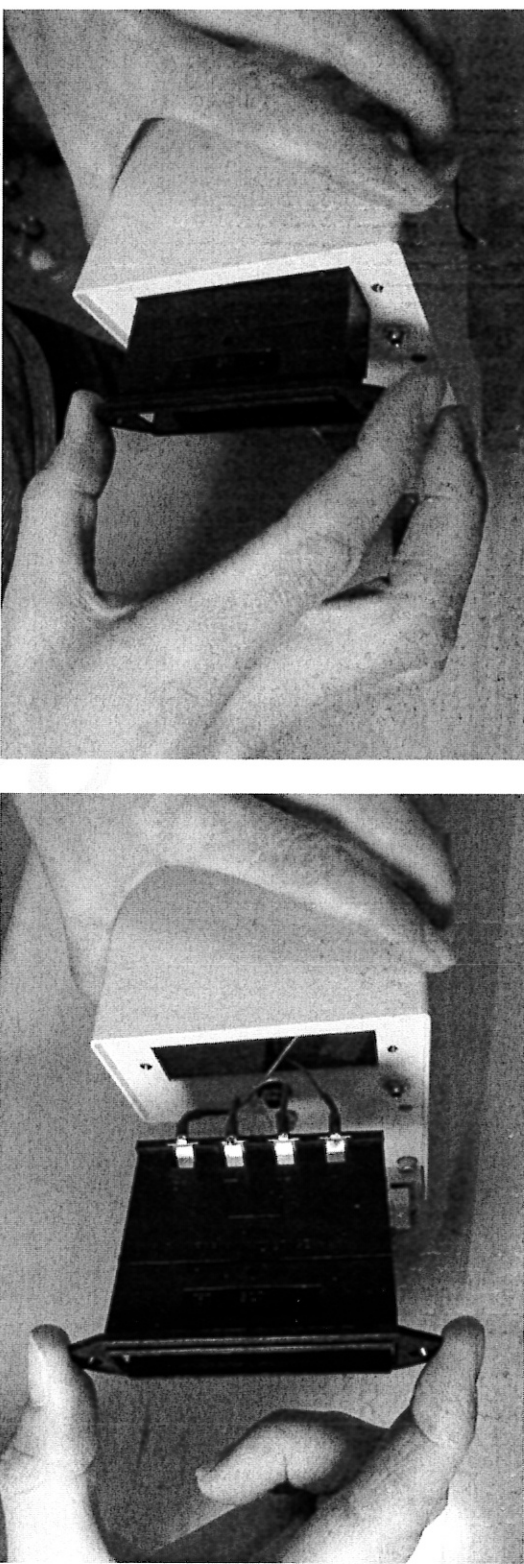
Step	Procedure
1	<p>Using a 5/32" Allen wrench, remove the two socket cap screws and washers from the rear of the device. Note the position of the screws before removing.</p> <p><b>Note:</b> Screws may be in alternate orientation as shown and length will vary between Bird™ and Bio-Med Devices blender cores.</p>  A line drawing of a rectangular device with a vertical section on the right. Two screws with washers are shown being removed from the rear panel. Dashed lines indicate the original positions of the screws. The screws are oriented horizontally, with the heads pointing towards the rear panel.
2	<p>Carefully slide flowmeter blender core assembly from monitor enclosure.</p>  A line drawing showing the removal of the flowmeter blender core assembly. The top part shows the device with the core assembly attached. A large downward-pointing arrow indicates the direction of removal. The bottom part shows the core assembly detached from the device.

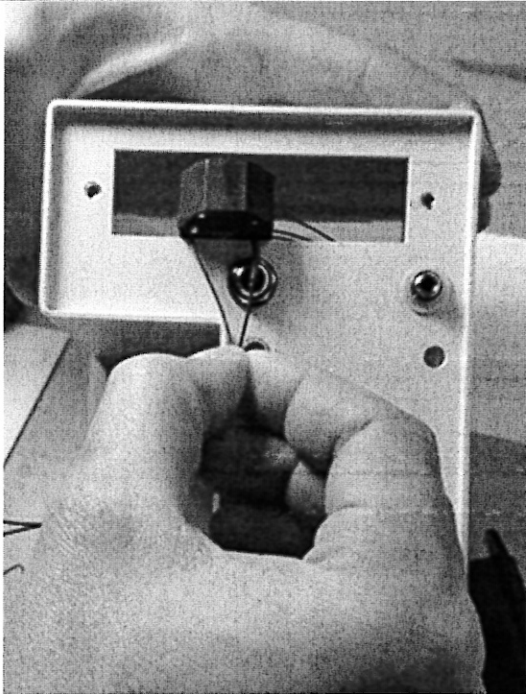
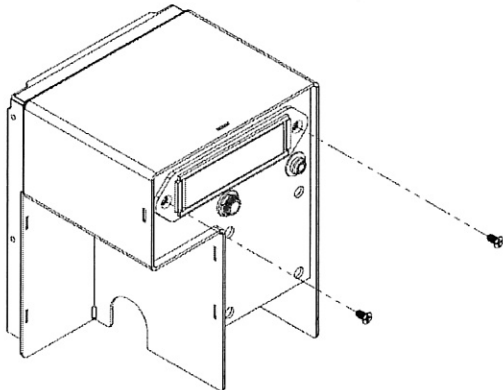
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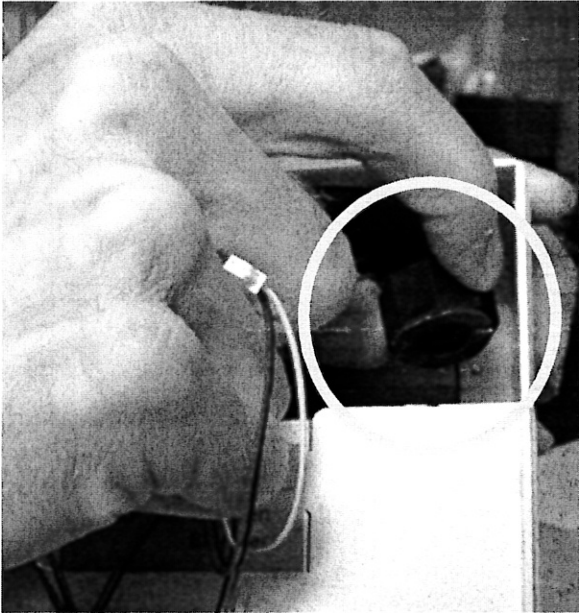
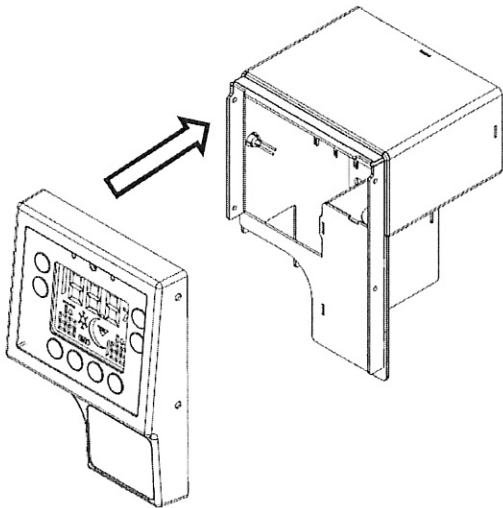
Remove the front Bezel assembly and disconnect all four (4) cable assemblies from the PCBA. Refer to Front Bezel Assembly Removal for more detail.



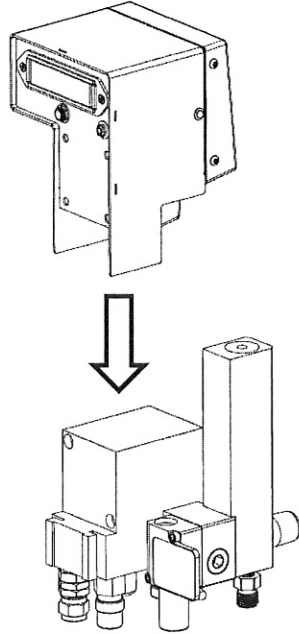
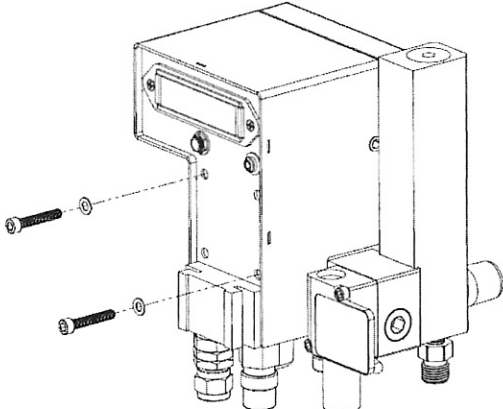
4	Gently peel up the alarm from the case. Carefully clean off any excess adhesive remaining on the surface.	
5	Remove the Philips screws from the battery drawer.	

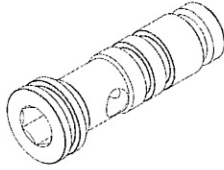
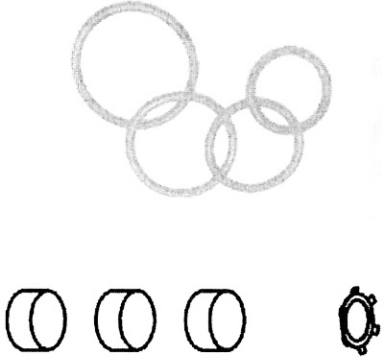
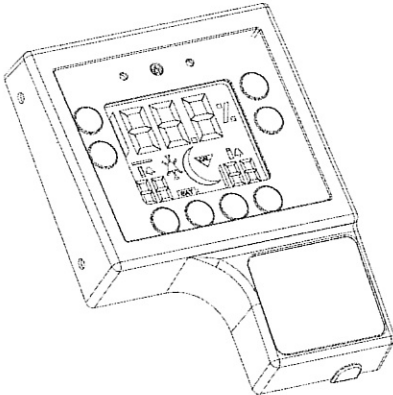
6	<p>Remove the battery drawer from the rear of the device and feed the wire assembly and alarm through the opening.</p>	
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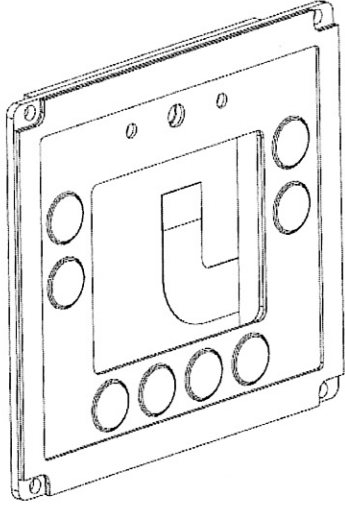
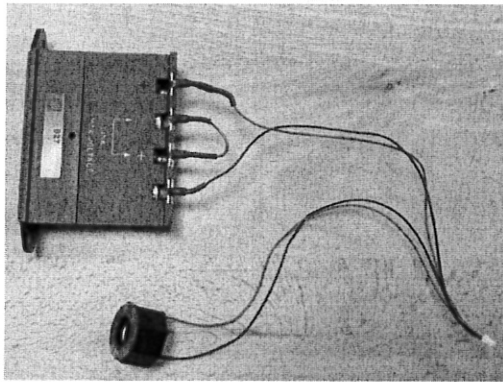
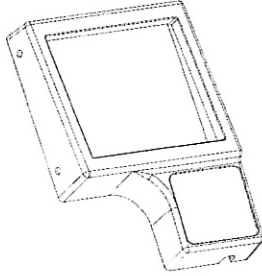
		
7	Insert the new alarm and battery drawer through the opening. Fasten the battery drawer using the Philips screws.	

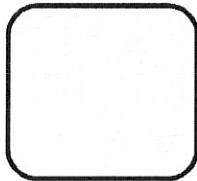



8	<p>Remove the adhesive backing from the new alarm and firmly press down into place over the alarm holes.</p> <p><b>Note:</b> Be sure to align the alarm directly over the holes in the case.</p>	
9	<p>Re-attach the front Bezel assembly according to Front Bezel Assembly Installation.</p>	



10	Carefully slide flowmeter blender core assembly into monitor enclosure.	 A line drawing showing a rectangular flowmeter blender core assembly being lowered into a larger rectangular monitor enclosure. A large downward-pointing arrow indicates the direction of movement.
11	Using 5/32" Allen wrench, install the two socket cap screws and washers to the rear of the device and firmly tighten. It is helpful to manually start both screws before fully tightening.	 A line drawing of the assembled unit from a rear perspective. Two screws with washers are shown being installed into the rear panel. Dashed lines indicate the alignment of the screws with the mounting holes.

Replacement Parts		
Description		Part Number
<b>Flowmeter Manifold Bolt</b>		<b>R228P39</b>
<b>Manifold Service Kit</b> (Includes: Flowmeter Manifold Bolt O-rings, Bleed Muffler Elements, and Star Retainer)		<b>R229P06</b>
<b>Front Bezel Assembly</b> (Includes: Front Bezel, Keypad and PCBA)		<b>R229P07</b>

<p><b>Keypad Assembly</b> (Includes: Keypad, Front/Rear Gaskets and PCBA Mounting Screws)</p>		<p><b>R229P08</b></p>
<p><b>Battery Drawer/Alarm Assembly</b></p>		<p><b>R229P05</b></p>
<p><b>Plastic Front Bezel</b></p>		<p><b>R203P01</b></p>

<p><b>Front Bezel Label</b></p>		<p><b>R228P94</b> (MaxBlend2 High Flow)</p> <p><b>R228P95</b> (MaxBlend2 Low Flow)</p>
<p><b>Oxygen Sensor w/Diverter</b></p>		<p><b>R140P02-001</b></p>
<p><b>Sensor Cable</b></p>		<p><b>R228P49</b></p>
<p><b>Power Supply (USA)</b></p>		<p><b>R230P10</b></p>

<b>Power Supply (International)</b>		<b>R230P03</b>
<b>Oxygen Compatible O-ring Lubricant</b>		<b>RP24P02</b>

# Flow Correction Charts

The MaxBlend 2 is designed for air and oxygen inlet pressures of 50 - 73 psi (3.4 - 5 bar).  
The following charts illustrate the effect of inlet pressure on the indicated flow:

**MaxBlend 2 Low Flow**

Flowmeter Setting (LPM)	50 PSI (3.4 BAR)	58 PSI (4 Bar)	72 PSI (5 Bar)
0	0	0	0
0.5	0.5	0.5	0.6
1	1	1.1	1.2
2	2	2.2	2.4
3	3	3.3	3.7
5	5	5.4	6.1
10	10	10.9	12.2
15	15	16.3	18.4
20	20	21.7	24.5
25	25	27.2	30.6
30	30	32.6	36.7

**MaxBlend 2 High Flow**

Flowmeter Setting (LPM)	50 PSI (3.4 BAR)	58 PSI (4 Bar)	72 PSI (5 Bar)
0	0	0	0
2	2	2.2	2.5
4	4	4.5	5
6	6	6.7	7.4
9	9	10.1	11.2
12	12	13.4	14.9
15	15	16.8	18.6
20	20	22.4	24.8
30	30	33.6	37.2
40	40	44.8	49.6
50	50	56	62.1
60	60	67.2	74.5
70	70	78.4	86.9

Note: These charts are valid for flowmeters calibrated at 50 PSI (3.4 BAR). These charts do not define product specifications and should be used for reference only.