

Ultima Dual Airflow Pressure Sensor™ Kit Model 0580A/0580D

User Guide



A
Braebon Medical Corporation
Product



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Intended Use

The Ultima Dual Airflow Pressure Sensor™ is intended for use during sleep disorder studies as a measure of respiratory airflow for recording onto a data acquisition system.

The Ultima Dual Airflow Pressure Sensor™ is a battery-powered pressure transducer that uses state-of-the-art-miniaturized technology to detect and reproduce waveforms associated with respiratory airflow from both the nose and mouth. Respiratory pressures are converted into voltage signals compatible with a variety of data acquisition systems.

The differential pressure system uses either custom Braebon™ cannulas (Model 0589, 0588, 0582s, or others) or standard oxygen (O₂) cannulas with the Braebon™ safety filter. The single-use nasal cannula has a 0.2-micron hydrophobic filter that prevents the spread of contaminants between patients and prevents moisture damage to the pressure sensor. The cannula attaches to the positive input of the Ultima Dual Airflow Pressure Sensor™.




The pressure sensor essentially functions as an uncalibrated pneumotachograph. The sensor detects and amplifies pressure swings from the cannula using a stable pressure transducer capable of detecting differential pressures in the ± 25 cm H₂O range. The corresponding voltage is then output for data acquisition.

Safety Information

For your personal safety, please read the safety conventions and the warnings and cautions in this manual.

Safety Conventions

These are the safety conventions for this manual. The table below lists the safety symbol, the name for the symbol, and the meaning of the symbol.

	Warning	The Warning message appears in the manual before procedures or tasks that must be strictly observed to avoid patient injury or harm.
	Caution	The Caution message appears in the manual before procedures or tasks that must be strictly observed to avoid damage to the product.
	Note	The Note message contains important information to help the operator complete a procedure or task correctly.



Warnings

- The Ultima Dual Airflow Pressure Sensor™ is for diagnostic use only; it is **NOT** intended as an apnea monitor, and it is **NOT** to be used in life sustaining situations.
- U.S. Federal law restricts this device to sale by or on the order of a physician.
- Always use a new single-use Ultima Airflow Pressure Cannula (Model 0589, 0588, 0582s, or others) and a new Braebon™ safety filter (Model 0583) with each patient. The Braebon™ safety filter is required to prevent the spread of contaminants between patients and to prevent moisture damage to the pressure sensor. Failure to use the Braebon™ safety filter will void the warranty.
- To prevent dust contamination to the pressure sensor always keep safety filters attached to the unit and change the safety filters immediately prior to next patient use.



Cautions

- Use only isopropyl alcohol pads to clean the pressure sensor.
- Do **NOT** immerse the pressure sensor (Model 0585) in any liquids.
- Do **NOT** steam autoclave or gas sterilize the pressure sensor or damage will result.
- Use two 1.5V AA batteries or damage to the Ultima Dual Airflow Pressure Sensor™ will result. Do **NOT** mix battery types. Do **NOT** insert the batteries backwards.
- If mounting the pressure sensor on the wall, mount the unit upside down to minimize the likelihood of bending or kinking the cannula tubing.

Features of the Ultima Dual Airflow Pressure Sensor™

- **Six Outputs**

- **Nasal Airflow & Snoring Output** Pure or raw nasal airflow pressure with superimposed snoring signal
- **Nasal Airflow Output** Filtered nasal airflow pressure with no snoring signal
- **Nasal Snoring Output** Snoring signal from upper airway pressure vibrations
- **Oral Airflow & Snoring Output** Pure or raw oral airflow pressure with superimposed snoring signal
- **Oral Airflow Output** Filtered oral airflow pressure with no snoring signal
- **Oral Snoring Output** Snoring signal from upper airway pressure vibrations

- **Three Inputs**

- **Nasal Input** Facilitates combining nasal and oral breathing on one channel by connecting a Braebon™ Ultima Oral/Nasal Cannula (Model 0589) to the nasal input only
Facilitates recording nasal breathing only using any nasal cannula with a Braebon™ Safety Filter (Model 0583) connected to the nasal input only
- **Differential Nasal Input** Facilitates connection to a CPAP circuit
- **Oral Input** Facilitates recording nasal and oral breathing on separate channels by connecting a Braebon™ Ultima Oral & Nasal Dual Lumen Cannula (Model 0588) to both the oral and nasal inputs

- **Gain and Baseline Adjustment**

- **Battery Status Indicator LED** Blinks green every 10 seconds to indicate the batteries are OK
Blinks red every two seconds to indicate the batteries are low
- **ON/OFF Switch** Auto-Off (after 10 hours run-time)
- **Battery Powered** 2 AA Alkaline Batteries

Dual Airflow Pressure Sensor Kit (0580A/0580D) Contents

The 0580A and 0580D Dual Airflow Pressure Sensor kits include the following items:

- One Ultima Dual Airflow Pressure Sensor™ (Model 0585)
- One adult dual lumen nasal & oral cannula with hydrophobic filter (Model 0588)
- One adult nasal/oral cannula with hydrophobic filter (Model 0589)
- Two adult nasal micro cannulas with hydrophobic filter (Model 0582s)
- One AC Interface Cable (Model 0592)
- One DC Interface Cable (Model 0594)
- Two 1.5 volt AA alkaline batteries (installed when shipped from the factory)
- One User Guide

In addition to the items mentioned above, the 0580A Dual Airflow Pressure Sensor Kit for Alice includes the following:

- Two Alice Interfaces for the 0585 Dual Pressure Sensor (Model 0586A)
- Two Alice Interface Cables (Model 0593)

About the Ultima Dual Airflow Pressure Sensor™

The Ultima Dual Airflow Pressure Sensor™ is a differential pressure transducer that detects and amplifies pressure swings in the ± 25 cm of H₂O range. The voltage corresponding to the differential pressure is output for data acquisition.

The Ultima Dual Airflow Pressure Sensor™ has three inputs and six outputs with an output range of ± 5 volts. With the Ultima Dual Airflow Pressure Sensor™, you can adjust the gain and baseline controls for both the nasal and oral output channels. The output range will vary according to the gain and baseline settings you used during recording.



Figure 1 The Ultima Dual Airflow Pressure Sensor™

Inputs

The Ultima Dual Airflow Pressure Sensor™ has three inputs: nasal input, nasal differential input (CPAP connection), and oral input.

Nasal Input

With the nasal input, you can either **combine** oral and nasal breathing into one channel using a single lumen, oral/nasal cannula connected to the nasal input or you can record **nasal** breathing **only** using any nasal cannula connected to the nasal input.

Nasal Differential Input

With the nasal differential input, you can subtract a known pressure from the nasal baseline by connecting your CPAP circuit to the nasal differential input.

The nasal differential input is your baseline for the nasal input. If you do not connect anything, then you are using atmospheric pressure as your baseline for your nasal input. However, if you attach a CPAP circuit to the nasal differential input, then you are using the CPAP pressure as the baseline instead of atmospheric pressure.







Oral Input

With the oral input, you can record oral and nasal breathing on **separate** channels using a dual lumen, oral and nasal cannula connected to both the oral and nasal input.

Outputs

On the left side of the Ultima Dual Airflow Pressure Sensor™, there are six outputs — three nasal outputs and three oral outputs. See Table 1 Output Types. You may choose to record from one to six outputs from the Ultima Dual Airflow Pressure Sensor™.

Table 1 Output Types

Output Name	Signal Type	Example of Signal
<ul style="list-style-type: none"> Nasal Airflow & Snoring Output 	Pure or raw nasal airflow pressure with superimposed snoring signal	 <p>Nasal Airflow and Snoring (Unfiltered)</p>
<ul style="list-style-type: none"> Nasal Airflow Output 	Filtered nasal airflow pressure with no snoring signal	 <p>Nasal Airflow (Snoring Filtered Out)</p>
<ul style="list-style-type: none"> Nasal Snoring Output 	Snoring signal from upper airway pressure vibrations	 <p>Nasal Snoring (Airflow Filtered Out)</p>
<ul style="list-style-type: none"> Oral Airflow & Snoring Output 	Pure or raw oral airflow pressure with superimposed snoring signal	 <p>Oral Airflow and Snoring (Unfiltered)</p>
<ul style="list-style-type: none"> Oral Airflow Output 	Filtered oral airflow pressure with no snoring signal	 <p>Oral Airflow (Snoring Filtered Out)</p>
<ul style="list-style-type: none"> Oral Snoring Output 	Snoring signal from upper airway pressure vibrations	 <p>Oral Snoring (Airflow Filtered Out)</p>

Gain and Baseline Adjustment Screws

On the right side of the Ultima Dual Airflow Pressure Sensor™, there are four, 20-turn screws that allow you to adjust both the gain and baseline settings for both the nasal and oral outputs. The baseline is set to zero volts in our factory. Under most circumstances, however, you will **NOT** need to make adjustments.

Gain adjustment screws

There are two gain adjustments screws: a nasal gain screw and an oral gain screw. The nasal gain screw allows you to adjust the gain for all the nasal outputs. Similarly, you can adjust the gain for all the oral outputs with the oral gain screw.

By adjusting the gain or sensitivity, you enlarge or reduce the size of the waveform on the display of your recording system. You do not change the actual recorded signal.

By turning the gain screw clockwise, you increase the sensitivity to make the signal larger. By turning the gain screw counterclockwise, you decrease the sensitivity to make the signal smaller.

Baseline adjustment screws

The baseline is set to zero volts in our factory. Under most circumstances, however, you will **NOT** need to make adjustments.

If you do want to make adjustments, there are two baseline adjustments screws: a nasal baseline screw and an oral baseline screw. The nasal baseline screw allows you to adjust the baseline for all the nasal outputs. Similarly, you can adjust the baseline for all the oral outputs with the oral baseline screw.



Caution: Do **NOT** adjust the baseline without a voltmeter.

When you turn the baseline adjustment screw, you change the position of the waveform on the display of your recording system. You move the waveform further up or further down on the display so you can view the signal peak-to-peak. The baseline is set to zero volts in the factory.

By turning the baseline screw clockwise, you move the baseline higher; that is, increase the baseline voltage. By turning the baseline screw counterclockwise, you move the baseline lower; that is, decrease the baseline voltage.

Battery Status Indicator LED

Centred on the face of the Ultima Dual Airflow Pressure Sensor™, there is a Battery Status Indicator LED. The LED flashes either green or red to indicate the status of the batteries in the Ultima Dual Airflow Pressure Sensor™. See Table 2 Battery Status.

Usually, the batteries will last about 30 - 50 nights (8-hour recordings) depending on the battery type used. When the Battery Status Indicator LED blinks red, replace your batteries with new AA alkaline batteries. See the Troubleshooting section, if the LED is not blinking.

Table 2 Battery Status

LED Color	Period	Status
One Green Blink, One Red Blink	At Start-up Only	Pressure Sensor is ON
GREEN	Every 10-15 Seconds	Battery OK
RED	Every 2 Seconds	Battery LOW

Connecting the Ultima Dual Airflow Pressure Sensor™



Warning: Always use a new single-use Ultima Airflow Pressure Cannula (Model 0589, 0588, 0582s, or others) and a new safety filter (Model 0583) with each patient. The safety filter is required to prevent the spread of contaminants between patients and to prevent moisture damage to the pressure sensor.



Caution: To prevent dust contamination to the Ultima Dual Airflow Pressure Sensor™, keep safety filters attached to the unit at all times and change the safety filters immediately prior to patient use.

Connecting the Ultima Dual Airflow Pressure Sensor™ to your sleep system and to the patient consists of four steps:

STEP 1: Connect the pressure sensor to your sleep recording system.

STEP 2: Connect the safety filter on the cannula to the pressure sensor inputs.

STEP 3: Position the cannula on the patient.

STEP 4: Adjust the gain, if necessary.

STEP 1: Connect the pressure sensor to your sleep recording system.

The connection set-up and recorder settings for the pressure sensor depend upon the sleep recording system you are using:

- **AC Amplifier** See "To connect to an AC amplifier" on page 14.
- **DC Amplifier, DC Input, or Multiplexer connection** See "To connect to a DC amplifier, DC Input, or Multiplexer connection" on page 15.
- **Alice^a** See "To connect to Alice (Respironics)" on page 16.

a. Alice is a registered trademark of Respironics Inc.

To connect to an AC amplifier

1. Using the AC Interface cable (Model 0592), connect a 1 mm keyhole connector to each of the outputs you would like to record. You may record from one to six outputs.
2. Connect the 1.5 mm safety pin connectors to your headbox.
3. Use the Braebon™ recommended AC recorder settings listed in Table 3 AC Recorder Settings.

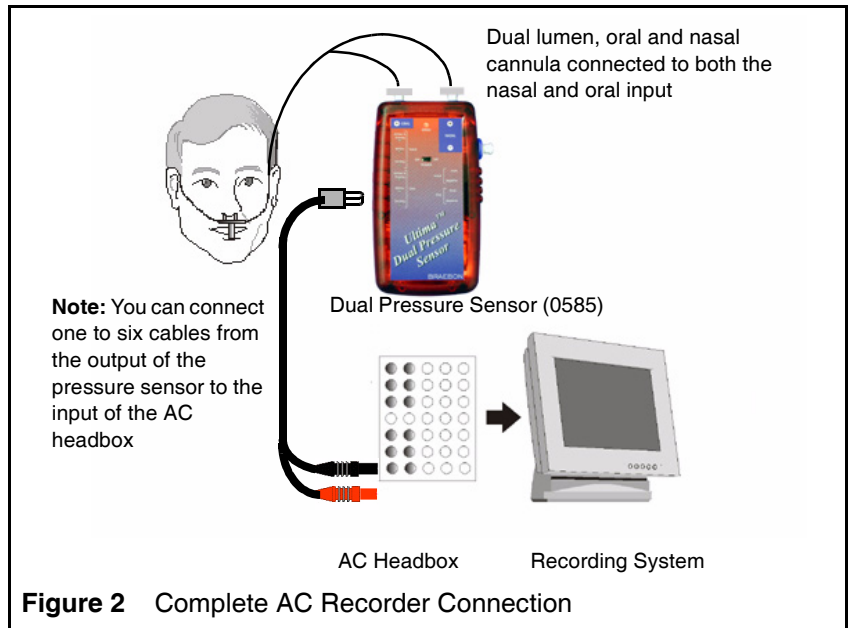
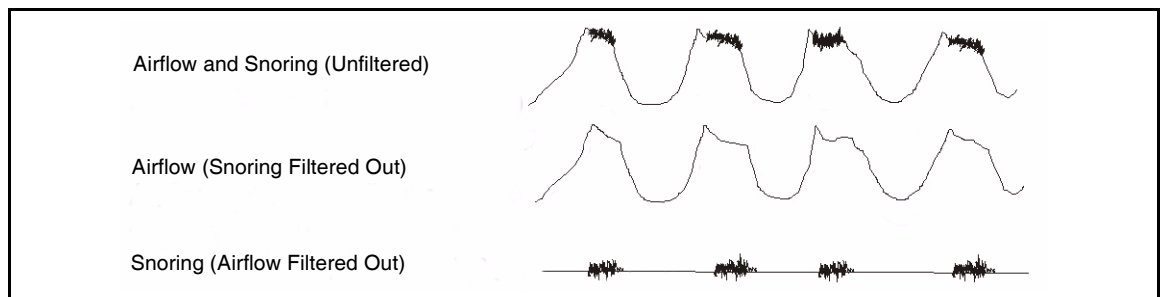


Table 3 AC Recorder Settings

Channel Output	Low Frequency Filter (time constant)	High Frequency Filter	Gain/Sensitivity	Sampling Rate
Airflow & Snoring Output	0.05 Hz or lower (3 seconds or longer)	70 Hz or higher	20 mV/cm or 1000 x increase or decrease as necessary	100 Hz or greater
Airflow Output	0.05 Hz or lower (3 seconds or longer)	10 Hz or higher	20 mV/cm or 1000 x increase or decrease as necessary	20 Hz or greater
Snoring Output	10 Hz or lower (0.16 seconds or longer)	70 Hz or higher	20 mV/cm or 1000 x increase or decrease as necessary	100 Hz or greater



To connect to a DC amplifier, DC Input, or Multiplexer connection

1. Using the DC Interface cable (Model 0594), connect a 1 mm keyhole connector to each of the outputs you would like to record. You may choose to record from one to six outputs.
2. Connect the 1/8 inch female stereo connector to your DC amplifier.
3. Use the DC recorder settings listed in Table 4 DC Recorder Settings.

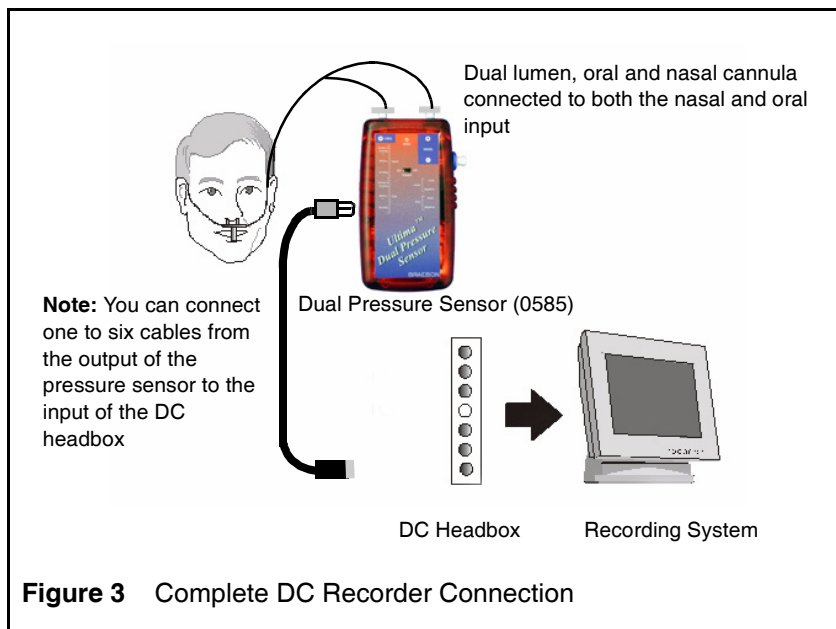
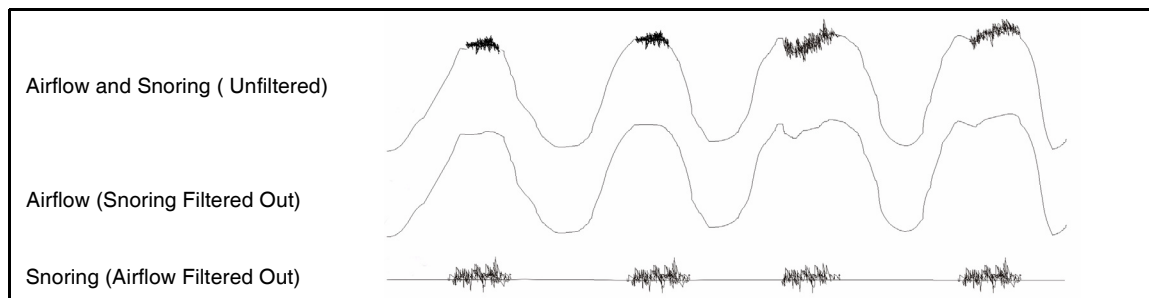


Table 4 DC Recorder Settings

Channel Output	Low Frequency Filter (time constant)	High Frequency Filter	Gain/Sensitivity	Sampling Rate
Airflow & Snoring Output	N/A	70 Hz or higher	20 mV/cm or 1000 x increase or decrease as necessary	100 Hz or greater
Airflow Output	N/A	10 Hz or higher	20 mV/cm or 1000 x increase or decrease as necessary	20 Hz or greater
Snoring Output	N/A	70 Hz or higher	20 mV/cm or 1000 x increase or decrease as necessary	100 Hz or greater



To connect to Alice (Respironics)

1. Using the Alice Interface cable (Model 0593), connect a 1 mm keyhole connector to each of the outputs you would like to record. You may choose to record from one to six outputs.
2. Connect the RCA connector to the 0586A interface.
3. Plug the RJ11 connectors into your Alice DC box.
4. Use the recorder settings listed in Table 5 Alice Recorder Settings.

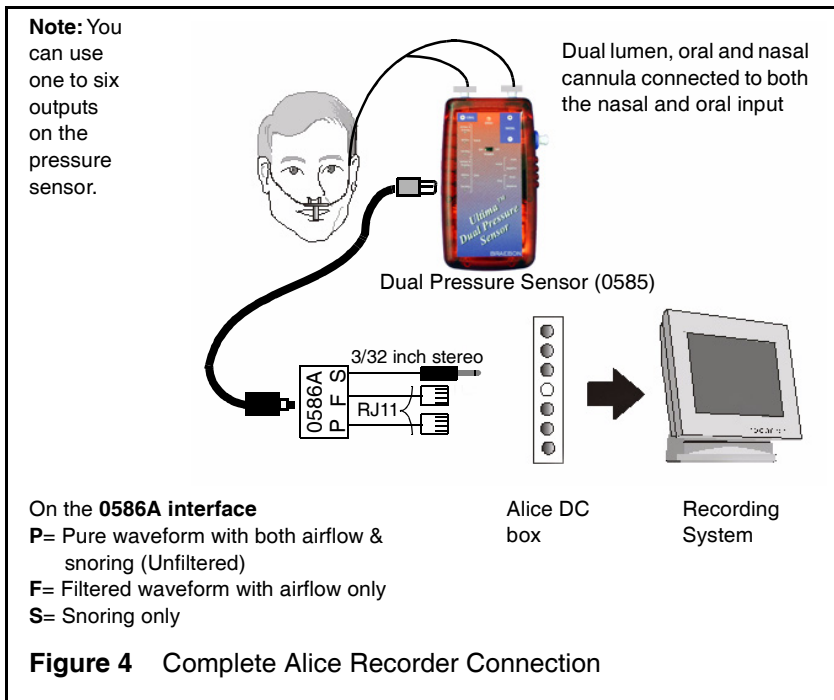
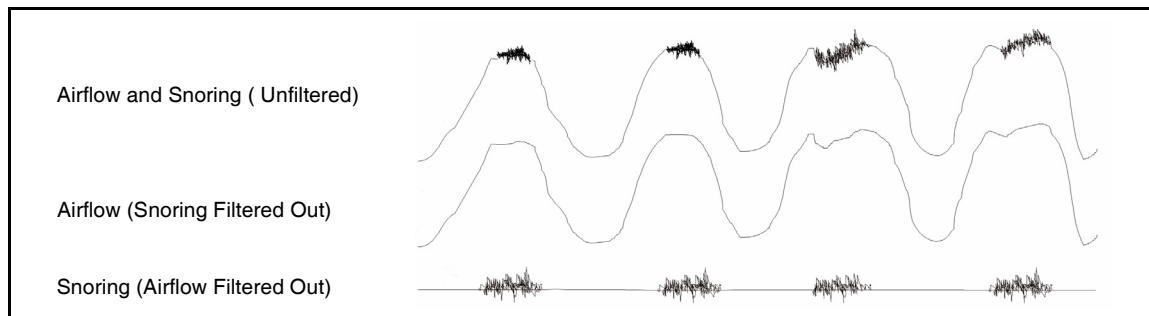


Table 5 Alice Recorder Settings

Channel Output	Low Frequency Filter (time constant)	High Frequency Filter	Gain/Sensitivity	Sampling Rate
Airflow & Snoring Output	N/A	70 Hz or higher	7	N/A
Airflow Output	N/A	10 Hz or higher	7	N/A
Snoring Output	N/A	70 Hz or higher	7	N/A



STEP 2: Connect the safety filter on the cannula to the pressure sensor inputs.

The inputs you use on the pressure sensor depend upon whether you plan to record nasal and oral breathing on separate channels or on a single channel, record nasal breathing only, or perform a CPAP titration study in which you subtract a known pressure from the nasal baseline.

- **Record nasal and oral breathing on separate channels** Using a Braebon™ Ultima Oral & Nasal Dual Lumen Cannula (Model 0588), connect the safety filters on the cannula to the nasal and oral inputs.
- **Combine nasal and oral breathing into one channel** Using a Braebon™ Ultima Oral/Nasal Cannula and filter (Model 0589), connect the safety filter on the cannula to the nasal input only.
- **Record nasal breathing only** Using any cannula with a Braebon™ Safety Filter (Model 0583) attached, connect the safety filter on the cannula to the nasal input only.
- **Subtract a known pressure from the nasal baseline**
 1. Connect the CPAP circuit to the Braebon™ Safety Filter (Model 0583). See Figures 5, 6, and 7 for illustrations of different CPAP connection options.
 2. Connect the safety filter to the nasal differential input on the Ultima Dual Airflow Pressure Sensor™.

NOTE: You will only be able to affect the baseline on the nasal output signals.

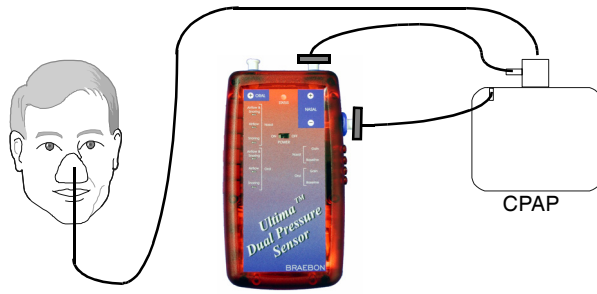


Figure 5 CPAP Adapter Connection and Connection to the Nasal Differential Input

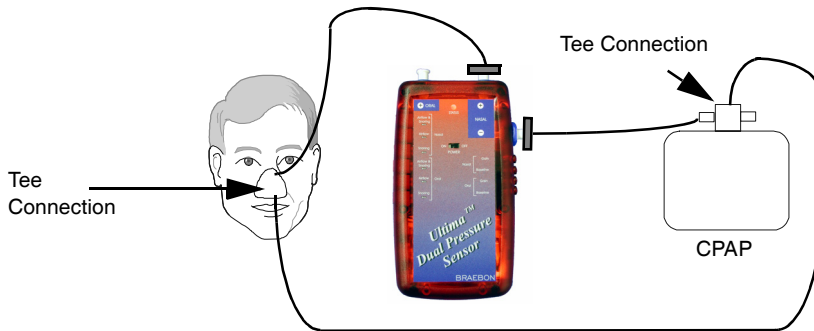


Figure 6 CPAP Mask Connection and CPAP Tee Connection to the Nasal Differential Input

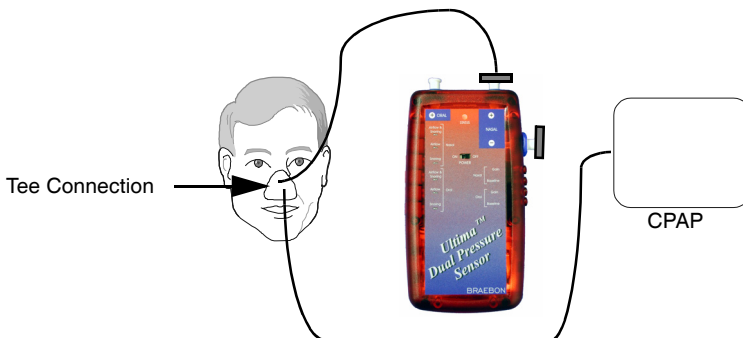


Figure 7 CPAP Mask Connection

STEP 3: Position the cannula on the patient.



Warning: Always use a new single-use Ultima Airflow Pressure Cannula (Model 0589, 0588, 0582s, or others) and a new Braebon™ safety filter (Model 0583) to prevent the spread of contaminants between patients and to prevent damage to the pressure sensor.

1. Position the Ultima Pressure Sensor Cannula on the patient and place the cannula sensor tips into the nose and in front of the mouth as illustrated in Figure 8.

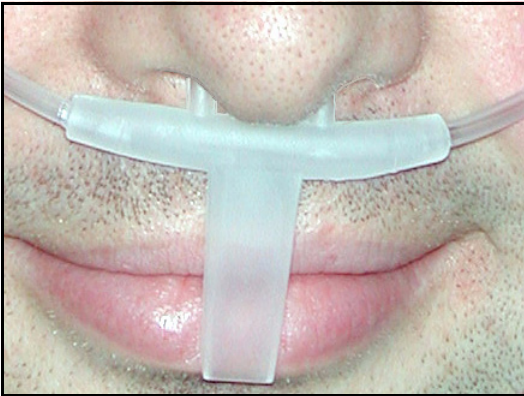


Figure 8 Positioning the Cannula

2. Once the nasal/oral prongs are comfortably placed, slide the cannula tubing over the patient's ears and down the front of the chest.
3. Slide the cinch tubing toward the neck for a comfortable fit under the chin.



Caution: If you are mounting the pressure sensor on the wall, mount the unit upside down to minimize the likelihood of bending or kinking the cannula tubing.

4. Mount the pressure sensor on the wall or bedside table.

STEP 4: Adjust the gain, if necessary.

The Ultima Dual Airflow Pressure Sensor™ contains four 20-turn potentiometers (pots) which allow for precise adjustment of both gain and baseline settings for the nasal and oral outputs. Under most circumstances, you will **NOT** need to make any adjustments.

Adjusting the gain

You can enlarge or reduce the size of the waveform on the display by turning the gain screw clockwise or counterclockwise respectively. You do not change the actual recorded signal when you increase or decrease the gain.

To adjust the nasal or oral gain

1. To increase the gain (enlarge the waveform), turn the appropriate gain screw clockwise.
2. To decrease the gain (shrink the waveform), turn the appropriate gain screw counterclockwise.

Adjusting the baseline

When you turn the baseline adjustment screw, you change the position of the waveform on the display of your recording system. By turning the screw clockwise or counterclockwise, you move the waveform further up or further down on the display so you can view the signal peak-to-peak. The baseline is set to zero volts in the factory.



Caution: Do **NOT** adjust the baseline without a voltmeter.

To adjust the nasal or oral baseline

1. Using the interface cable appropriate to your recording system, connect a 1 mm keyhole connector to either the Nasal Airflow and Snoring output or the Oral Airflow and Snoring output.
2. Connect the voltmeter to the interface cable.
3. Do the following:
 - To move the baseline higher, that is increase the baseline voltage, turn the appropriate baseline screw clockwise.
 - To move the baseline lower, that is decrease the baseline voltage, turn the appropriate baseline screw counterclockwise.

Calibrating the Ultima Dual Airflow Pressure Sensor™

The Ultima Dual Airflow Pressure Sensor™ is a qualitative pressure sensor designed to measure nasal and/or oral pressure associated with human respiratory activity. For qualitative purposes, you do not need to calibrate the pressure sensor. However, you may obtain quantitative data when you calibrate the pressure sensor with a water manometer.

To calibrate the Ultima Dual Airflow Pressure Sensor™

1. Connect the pressure sensor to the water manometer and the headbox of your recording system as shown in Figure 9.
2. Using a manometer, apply a known pressure not exceeding ± 25 cm H₂O to the sensor input.
3. On your data acquisition system, set a corresponding voltage for the known pressure.
4. Repeat steps 2 and 3 for the remaining inputs.

On many data acquisition systems you will need to perform this procedure for a DC High calibration (10 cm H₂O) and for a DC Low calibration (-10 cm H₂O). When the patient breathes in (inspiratory flow), you should see a negative, upward tracing on your display.

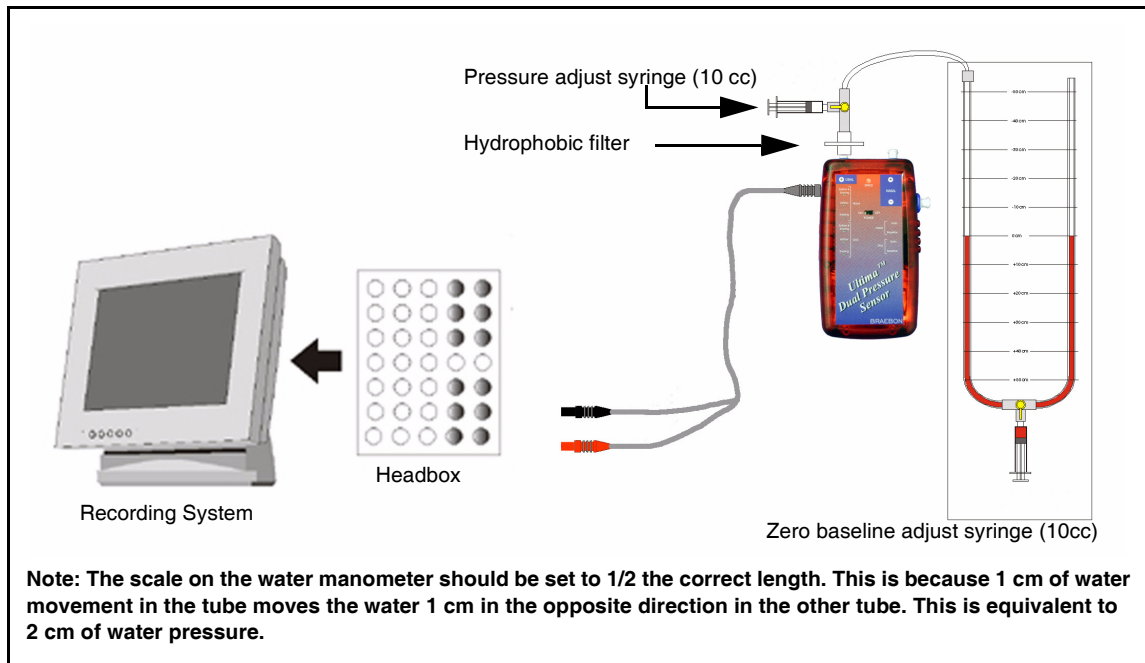


Figure 9 Calibration Schematic

Maintaining the Ultima Dual Airflow Pressure Sensor™



Warning: Always use a new single-use Ultima Airflow Pressure Cannula (Model 0589, 0588, 0582s, or others) and a new Braebon™ safety filter (Model 0583) to prevent the spread of contaminants between patients and to prevent damage to the pressure sensor.



Caution: To prevent dust contamination to the pressure sensor always keep safety filters (Model 0583) attached to the unit and replace the safety filters immediately prior to the next patient.



Caution: Use only isopropyl alcohol pads to clean the pressure sensor. Never immerse the pressure sensor (Model 0585) in any liquids. Do **NOT** steam autoclave or gas sterilize the pressure sensor or damage will result.

Continued use of Braebon™ safety filters (Model 0583) is the best way to maintain your pressure sensor. The safety filter extends the life of the pressure sensor because it prevents particulates and moisture from damaging the pressure sensor.

To maintain your Ultima Dual Airflow Pressure Sensor™

1. Attach a safety filter (Model 0583) to **EVERY** cannula you connect to the pressure sensor.
2. When you store the pressure sensor, connect a safety filter (Model 0583) to each input on the pressure sensor to prevent dust contamination.
3. Replace your Ultima Airflow Pressure Cannula (Model 0589, 0588, 0582s, or others) and safety filter (Model 0583) after each use to prevent the spread of contaminants between patients.
4. Only clean the pressure sensor with isopropyl alcohol pads.

For additional information, refer to the Association for Professionals in Infection Control and Epidemiology (APIC) guidelines for selection and use of disinfectants (American Journal of Infection Control. Vol. 18, No. 2, April 1990).

Replacing the Battery

The batteries will last about 30 - 50 nights (8-hour recordings) depending on the battery type used.



Caution: Use only 1.5V AA batteries or damage to the Ultima Dual Airflow Pressure Sensor™ will result. Do **NOT** mix battery types. Do **NOT** insert the batteries backwards or damage may occur to the pressure sensor.



Caution: Before inserting the batteries, note the polarity of the batteries indicated at the bottom of the battery compartment. Do **NOT** insert the batteries backwards or damage may occur to the pressure sensor.

To replace the batteries

1. Press down and slide out the battery cover.
2. Remove the old batteries from the compartment.
3. Insert the new 1.5 volt AA batteries according to the positive (+) and negative (-) polarities indicated at the bottom of the battery compartment.
4. Slide the battery cover back onto the casing, ensuring the edges are sealed.

Troubleshooting

If you have difficulty using this product, please verify the following:

Problem	Solution
LED blinks Red every two seconds	<ul style="list-style-type: none">• Replace the batteries. <p>The batteries will last between 30 to 50 nights (8-hour recordings) depending on the batteries used (i.e., Alkaline vs. Lithium).</p>
LED does not blink	<ul style="list-style-type: none">• Switch off the unit. Wait 10 seconds, and then switch on the unit again.• Replace the batteries.• Contact technical support: North America call 1-888-462-4844 Outside North America call 1.613.831.6690 <p>When you call, have your model number, serial number, and a pen and paper ready.</p>
Spikes in the signal every 10 seconds	<ul style="list-style-type: none">• Replace the batteries.
Poor signals	<ul style="list-style-type: none">• Verify that the Ultima Dual Airflow Pressure Sensor™ is properly attached to both the patient and the headbox.• Verify that all amplifier recorder connections are functional.• Verify that the gain and filter settings are correct.

Product Specifications

Sensor Technology	Two Differential Pressure Transducers (with built-in circuit overload protection)
Input Types	Nasal Nasal Differential (CPAP) Oral
Output Types	Nasal Airflow and Snoring (Unfiltered) Nasal Airflow (Snoring filtered out) Nasal Snoring (Airflow filtered out) Oral Airflow and Snoring (Unfiltered) Oral Airflow (Snoring filtered out) Oral Snoring (Airflow filtered out)
Maximum Output Range	±5 Volts
Gain and Baseline	Variable
Input Pressure Range	±25 cm H ₂ O
Size (L x W x H)	5.0 x 2.8 x 0.9 inches (125 x 70 x 24 millimeters)
Weight in grams (including battery)	150
Battery Type	2 x AA batteries
Estimated Battery Life (# of 8-hour nights)	250 hours (30)
Auto-off (after 10 hours run-time)	Yes

Notes

Notes

Warranty

BRAEBON MEDICAL CORPORATION warrants to the first consumer that this Ultima Dual Airflow Pressure Sensor™ (the "Sensor"), when shipped in its original container, will be free from defective workmanship, performance and materials and agrees that it will, at its option, either repair the defect or replace the defective Sensor or part thereof at no charge to the purchaser for parts or labor for a time period of one year from the date of purchase. The warranty described herein shall be the sole and exclusive warranty granted by BRAEBON MEDICAL CORPORATION and shall be the sole and exclusive remedy available to the purchaser. Use of the Sensor constitutes total and complete acceptance of this warranty. Correction of defects, in the manner and for the time period described herein, shall constitute complete fulfillment of all liabilities and responsibilities of BRAEBON MEDICAL CORPORATION to the purchaser with respect to the Sensor and shall constitute full satisfaction of all claims, whether based on contract, negligence, strict liability or otherwise. In no event shall BRAEBON MEDICAL CORPORATION be liable, or in any way responsible, for any loss of revenues or damage, direct, incidental, or consequential, including property damage, loss of profit, or personal injury resulting from the use or misuse of, or the inability to use this product. Nor shall BRAEBON MEDICAL CORPORATION be liable, or in any way responsible, for any damages or defects in the Sensor which were caused by abuse, misuse, tampering, neglect, incorrect battery type, or repairs or attempted repairs performed by anyone other than an authorized servicer. Specifications subject to change without notice.



Caution: Failure to use the correct battery type as stated in this User Guide will void the warranty. Failure to use the Braebon™ hydrophobic filter (Model 0583) will void the warranty.

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