



ZepHr[®] impedance/pH recording system

Quick Start Guide

Total Reflux Monitoring

Setting Up the SD™ Card

1. Gather the appropriate supplies to begin a study, including:

- ZepHr and SD Card
- The appropriate Probe*
- New "AA" Batteries
- Calibration Kit, including fresh Sandhill Buffer
- Intubation Supplies



* Refer to the probe pouch for pre-study instructions

2. Double click on the Sandhill Applications icon on your computer desktop.



Open the ZepHr Software by double clicking on ZepHr icon.

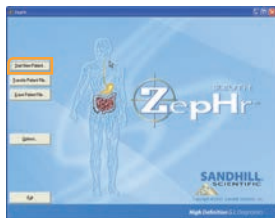


Sleuth ZepHr

3. Insert SD™ Card into card reader.



Select "Start New Patient".



4. Enter Patient Data.

Patient Data	
*Last Name	Physician
*First Name	Physician
Exam ID	Examining Physician
Study ID	Study Performed By
Order Number	
Exam ID	MM/DD/YYYY
Sex	Male Female

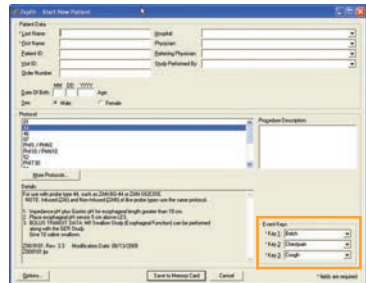
Note: Fields with * are required.

5. Select the protocol number that matches the number on the probe pouch. **01**

- a. Click "Options" if using AirFlow Sphincter Locator.
- b. If using manometry to determine probe placement, skip to step 8.

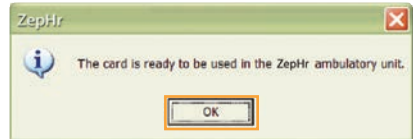
Setting Up the SD™ Card

8. Select symptoms for "Event Keys".



Note: Fields with * are required.

10. Click "OK".



- You may now remove the SD™ card from the card reader.
- Close the ZepHr program.
- Insert the card into the recorder.



Total Reflux Monitoring

Setting Up the the Recorder

1. a. Insert 2 NEW AA batteries into battery compartment of the ZepHr recorder.
b. Battery voltage will be displayed.



- c. Remove smoke-colored protective cover and insert configured SD card into ZepHr recorder - **the top of the card must align with the top of the recorder**
- d. Connect probe to ZepHr recorder.
Note: If there is not enough voltage for a 24 hour study, "low voltage" will be displayed on the screen.

2. Follow the screen prompts.
Push the **1** key for next screen.



3. The logger will go through a card configuration and then display probe data.
Push the **1** key for next screen.



4. Screen will display:
Calibrate
Start Procedure
Diagnostics
Setup
Standby



Use up and down arrow to select Calibrate.

Push the **1** key.

5. Place the probe in calibration tube with buffer 4 solution with all sensors submersed. Gently agitate the probe to remove air bubbles.

Note: External reference probes need the electrode attached to the patient. The patient's finger should be submersed in the buffer along with the probe.

Push the **1** key to start sampling process. If calibration with buffer 4 passes, "Continue" will be highlighted.

Push the **1** key to continue.

6. Rinse the probe and the patient's finger (if using an external reference probe), wipe and place the probe in calibration tube with buffer 7 solution with all sensors submersed. Agitate the probe to remove air bubbles.

Note: External reference probes need the electrode attached to the patient. The patient's finger should be submersed in the buffer along with the probe.

Push the **1** key to start sampling process.

Total Reflux Monitoring

Setting Up the the Recorder

7. If calibration is valid:
Push the **1** key for next step.

Verification of calibration:

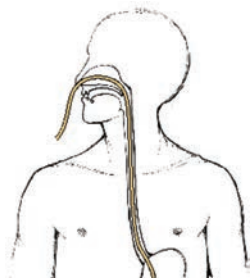
Check the pH values in buffers 4 and 7 and verify. Readings should be between 3.8 and 4.2 for buffer 4 and 6.8 and 7.2 for buffer 7.

Note: When using an external reference probe, place the probe and the patient's finger in the buffer when verifying.

The recorder will now display actual pH values. The pH on insertion can be documented to verify that the probe was initially in the stomach.

* If you experience calibration issues, please refer to the last page of this Quick Start Guide, "Calibration Checklist", to verify calibration steps.

8. Intubate the patient to the appropriate probe depth. Secure the probe.



9. Push the **1** key to start recording.

Review use of recorder with the patient



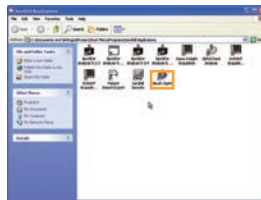
Total Reflux Monitoring

Downloading the Study

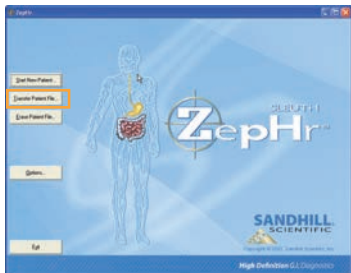
1. Stop the Recorder by pressing and holding the light button. While holding the light button, press the **1** key. Release both buttons simultaneously. Select Stop Recording. With the recorder in the Standby mode, remove at least 1 battery.



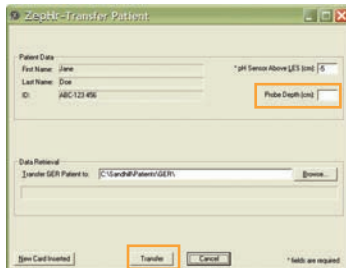
2. Extubate the patient and remove the SD™ card.
 - a. Turn on the computer workstation.
 - b. Insert SD Card into the reader on the computer workstation.
 - c. Double click on the ZepHr icon.



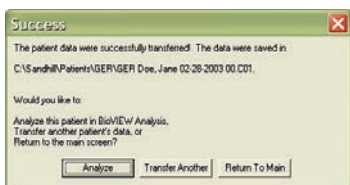
3. Select "Transfer Patient File".



4. Enter probe depth and click "Transfer".






5. When the study is completely transferred, the Success screen will appear. Select the appropriate option.




Total Reflux Monitoring

Editing Impedance/pH Studies

1. Open the study in BioVIEW Analysis.
 - Select 'Analyze when download complete'
 - or
 - Double click on 'Sandhill Applications' and doubleclick 'Analysis'.
2. Overview the entire study: esophageal pH and gastric pH (if probe has gastric electrode),
 - a. Identify and exclude artifact areas.
 - b. Add/remove/change any events such as symptoms, meals and body position as per patient diary.
 - c. Change all diary events to what is indicated on the diary by the patient.
3. Perform AutoSCAN™.

Review and select the AutoSCAN options that are desired for your study.
4. Review the study to verify symptom association within a 5 minute window prior to the event.
 - a. Turn on the "Analysis Tool".
 - b. Open to a 10 minute screen.
 - c. Use "Next Event" icon to move from symptom to symptom.
5. Delete any episode that is not a true reflux episode.
 - a. Use the "Axis Magnify Tool" to expand the reflux episode.
 - b. Reset the MII range (F5 key or manually adjusted) as needed for better visualization of reflux.
6. Add any missing reflux episode measurement areas via the following steps:
 - a. Expand the area with the Axis Magnify Tool in order to determine bolus direction.
 - b. Create a measurement box encompassing all MII and pH channels for the whole MII detected reflux episode.

**NOTE: Reflux characterized by a broader, deeper drop in impedance than seen with swallows (see example on next page)*
7.
 - a. Click "create measurement" icon
 - b. If "No Reflux" appears in the results box refer to users guide for advanced editing techniques.
8. Generate the final report with template appropriate for probe used.

Impedance/pH Monitoring identifies reflux using impedance and categorizes reflux episodes as acid or nonacid using pH.

Total Reflux Monitoring

Interpreting Impedance/pH Studies

Assess Symptom / GER relationship:

- Acid reflux and positive symptom association (> 50%)
- Nonacid reflux and positive symptom association (> 50%)
- All reflux and positive symptom association (\geq to 50%)
- May indicate that symptom could be due to something other than reflux.

A negative study has important diagnostic value; do not underestimate the value of a negative study!



Calibration Checklist

If your ZepHr recorder is unable to calibrate your probe:

- ✓ Verify probe and buffer expiration date.
- ✓ Confirm correct protocol.
- ✓ Confirm fresh Sandhill buffer.
- ✓ Calibrate in Buffer 4 then Buffer 7.
- ✓ Check probe package for pre-procedure probe instructions. Follow appropriate instructions for internal or external reference probes.
- ✓ Insure all sensors are submersed within the buffer solution.
- ✓ Gently agitate the probe to remove any air bubbles from pH sensor(s).
- ✓ Gently clean the probe connector with alcohol wipe and reconnect with recorder.
- ✓ Verify probe connection is secure.

Disclaimer: This information is to be used as a quick reference and does not constitute a complete reference. Please refer to the Sandhill Scientific Impedance-pH Monitoring Tutorial and User Guide for more detailed information.

Sandhill University...

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The objective of Sandhill University is to provide clinical users with the knowledge and skills necessary to effectively acquire and analyze High Resolution Impedance-Manometry studies, impedance-pH reflux monitoring studies and anorectal manometry studies.

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SANDHILL
SCIENTIFIC
a medovations company

Corporate Headquarters
102 East Keefe Avenue
Milwaukee, WI 53212 USA
800.558.6408 or 414.265.7635
Fax 414.265.7628

sales@sandhillsci.com
orders@sandhillsci.com

Technical Research & Training Center
9150 Commerce Center Circle #500
Highlands Ranch, CO 80129 USA
800.558.6408 or 303.470.7020
Fax 303.470.2975

technicalsupport@sandhillsci.com
clinicalsupport@sandhillsci.com
clinicaleducation@sandhillsci.com