

LI-COR LI-7820 Analyzer and Smart Chamber Combination SOP

2024-09-09

SOP STATUS: **Completed** ▾ REVIEW STATUS: **Under review** ▾

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PURPOSE

The purpose of this procedure is to explain how to measure greenhouse gas emissions using the LI-COR 7820 trace gas analyzer and the 8200 smart chamber combo. Pre-installed soil collars are used to take point measurements of soil N₂O emissions, soil water content and temperature, and other soil dynamics. The 8200 smart chamber's wireless hotspot and software allows taking measurements in real-time.

SCOPE

The scope of this procedure is limited to the usage of a LI-COR LI-7820 combined with a 8200 smart chamber. All materials and methods specifically are used for this setup. If other devices are used to substitute the necessary materials, do not refer to this SOP.

REFERENCES AND RELATED DOCUMENTS

- [Smart Chamber](#)
- [LI-COR LI-7820 Trace Gas Analyzer](#)

MATERIALS

- LI-COR 8200 smart chamber
- Sensor soil probe
- LI-COR LI-7820 trace gas analyzer

DEFINITIONS



Figure 1 (left) :Analyzer and chamber setup. Figure 2 (right): Analyzer screen



Figure 8: The collar alignment slot and surrounding rubber gasket.

DETAILED PROCEDURE

1. Turn on the power for the chamber press power button (silver button with illuminated ring) for approximately 4 seconds. It will blink green, and become steady when fully operative (takes roughly 5-10 seconds).
2. To turn on Analyzer when completely shut down: press power button for roughly 10 seconds the scene will display and notify that the analyzer is warming up.
3. To turn-on/activate the analyzer from sleep mode press the power button once: the scene display will seemingly restart and start warming.
4. When fully functional and ready, the scene will display a notification “Measuring” accompanied with a check mark (*Figure 1*).
5. Use a smartphone/computer to connect via the WIFI/chamber’s hotspot.
6. Using the given net-ID of the chamber (each chamber has its own) connect to the operation software-platform through your browser.
7. When fully warmed, connected, and ready to measure, the display will show a green start button (*Figure 2*).

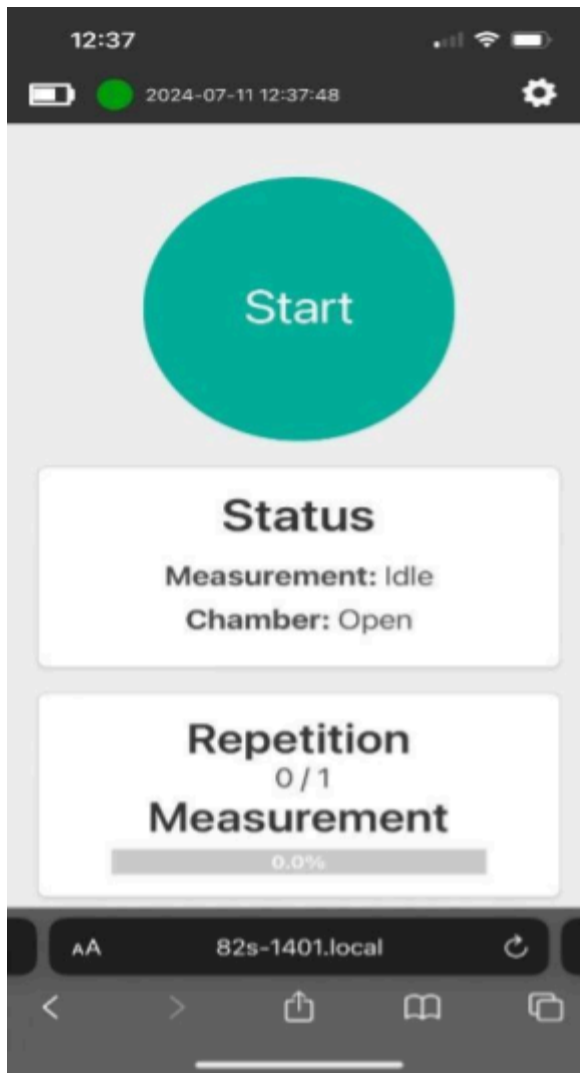


Figure 2: Starting screen

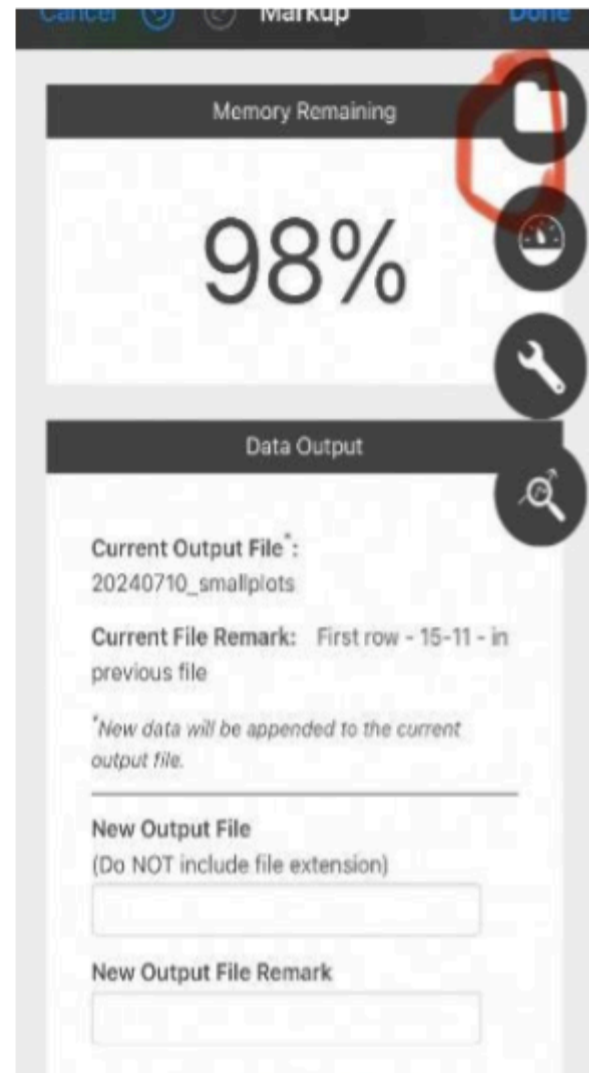


Figure 3: Output file setting

8. To update the output file in which measurements taken will be stored in, press the button on the upper right and select the file icon (Figure 3).
9. Label the output and press the green update button.
10. Ensure that you adjust all the necessary settings such as collar offset, analyzer detection, and soil type.
 - Press the button on the upper right and select the arrow icon(right under the file icon), all options should be displayed.
11. Return to the main display by selecting the home icon.
12. Choose variable display by selecting the box-displays (Figure 4).

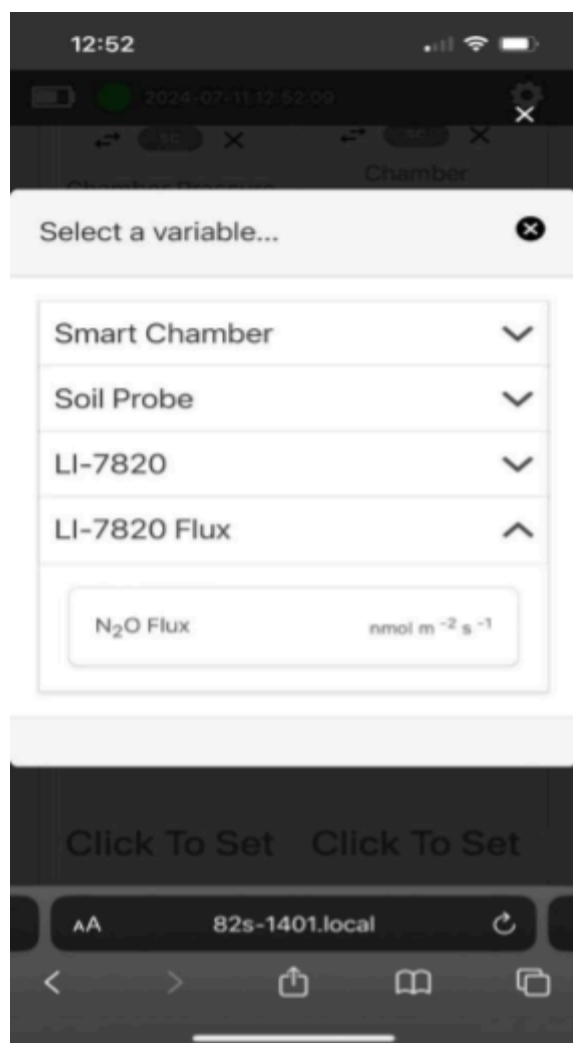


Figure 4: Variable selection screen

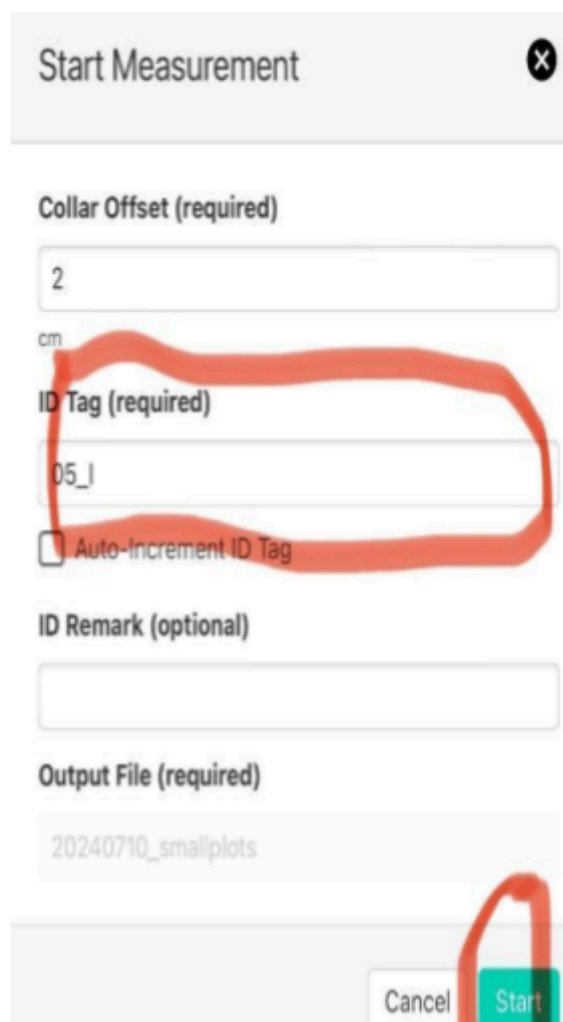


Figure 5: ID tag naming screen

13. Start taking your measurement by correctly placing the smart chamber on the collar ensuring the collar is placed in-between the black rubber and the chamber's frame (Figure 8).
14. Insert the soil sensor probe (Figure 7) (for readings of soil moisture, electrical conductivity, and temperature) in alignment with the chamber.
15. Select the start button to begin measuring, the system will automatically ask you to pre-label your measurement corresponding to the collar it will measure. Label and push start again (Figure 5).
 - o **Note:** the system will notify the user and refuse duplicate labels automatically
16. After labeling, press start. The chamber will automatically close and open at the end of the measurement (approximately 2-3 mins).

17. After each measurement, there will be a cleaning period which will display, and during which you cannot take measurements.
 - **Note:** You do not have to wait for the cleaning period to end before physically moving the chamber to another collar: once the chamber is fully open you can physically move on to another sampling collar but you will have to wait until the end of the cleaning period to take the following measurement.
18. After all measurements, revisit the “file-update” portal, scroll down to your file, and select download to acquire your collected data on your device (*Figure 6*).

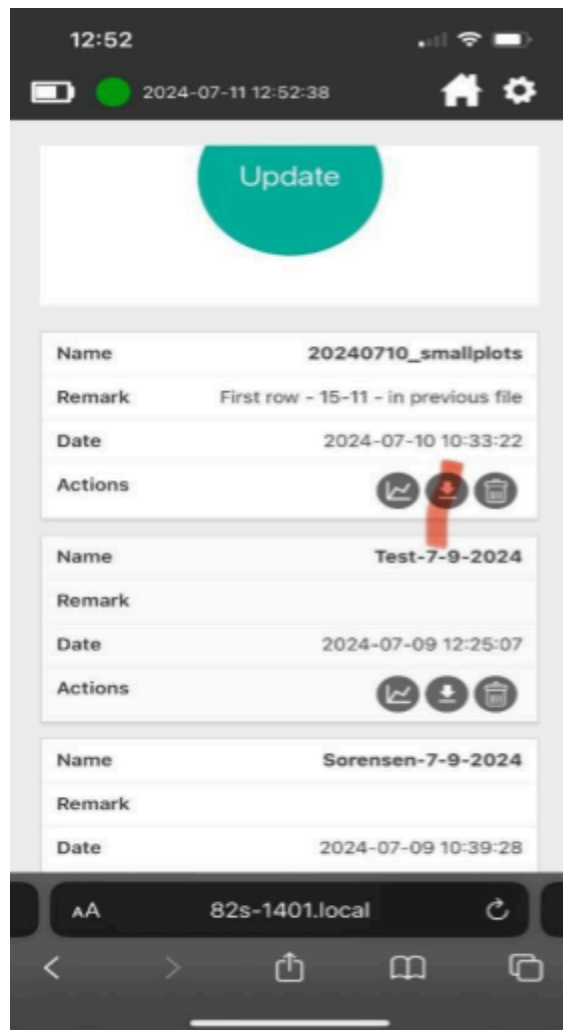


Figure 6: Dataset downloading screen



Figure 7: The soil sensor probe (blue arrow).

- **Note:** Your file can be found wherever your downloads are stored (e.g., iCloud, Google Drive, OneDrive, etc.)

DATA STORAGE INSTRUCTIONS

- A limited amount of cloud storage is available on the chamber, and data can be downloaded and processed using the soil flux pro software.
- For comprehensive data instructions refer to the **data_extraction_for_LI-COR_LI-7820_SOP** document.

TROUBLESHOOTING

- Warming from complete shutdown may take 20-30 mins for the analyzer to become completely warm and functional for measurements. As a result, it is suggested that the analyzer be placed on sleep mode instead.
 - To turn on analyzer when completely shut down: press power button for roughly 10 seconds, the screen will notify you that the analyzer is warming up.

FLOWCHART

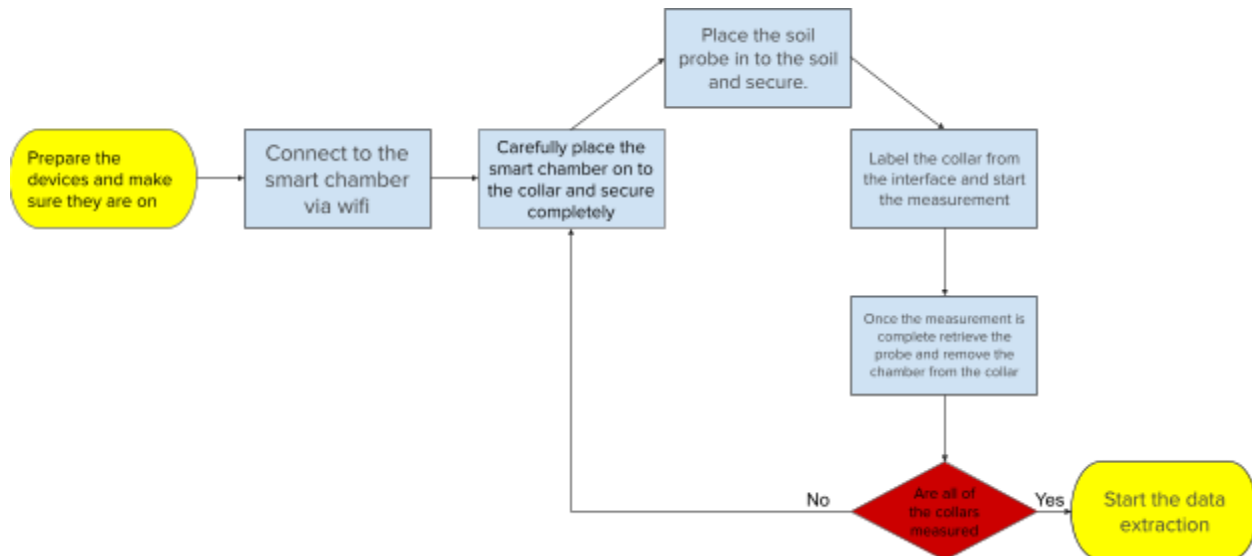


Figure 9: Flowchart for Analyzer Smart Chamber combo process.

NOTES

- This document only provides a minimum operational description of the LI-COR trace gas analyzer & smart chamber combo. Assembly of the analyzer and chamber will not be described here.
- Both the Analyzer and the Smart chamber are battery-dependent. The LI-7820 is rated for 8 hours on a single charge with two batteries; the 8200 Smart Chamber is rated for 34 hours use; 2 batteries, 17 hours per battery. It is recommended that the user carries a spare battery.
- Utilization of the LI-870 CO₂/ H₂O analyzer will not be included in this protocol.