LDARtools

phx21™ User Manual

Version 5
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phx21™ Connection End Plate:

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4. Power Button
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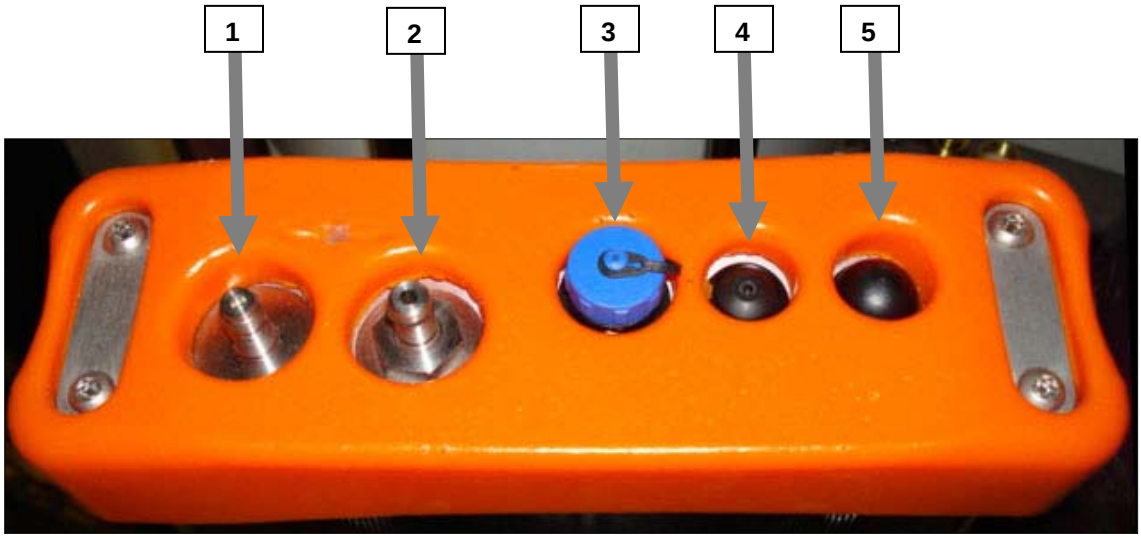


Section 2 phx21™ Maintenance Procedures

A. H_2 Fill Procedure

To Fill H_2 Bottle:

1. Remove cap over H_2 Fill port (Figure 1).
2. Make sure H_2 Cylinder has regulator in place and pressure is set at or below 1800 psi.

NOTE: Purge H_2 Fill adapter for ½ second by turning handle 180° clockwise, if pressure is below 500 lbs on top gauge.

3. Connect fill adapter to H_2 Fill port (Figure 2).
4. Turn handle 180° counter clockwise (Figure 3).
5. Wait 4 – 5 seconds.
6. Turn handle 180° clockwise (should hear a slight hiss from pressure release).
7. To release fill adapter pull up on collar of fill adapter.
8. Replace dust cap on H_2 Fill port.

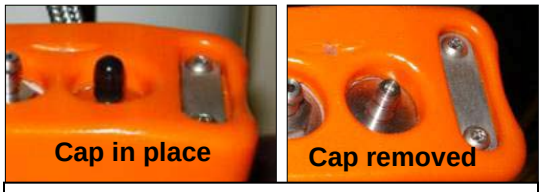


Figure 1

Figure 2: Fill Adapter should be in this position when first connected and when ready to release.

Figure 3

B. **Power On/Off Procedure**

Power Button:

1. No Light means that power is off.
2. Push and hold button for two seconds to turn power on.
3. Solid Green Light means power is on and phx21™ is connected via Bluetooth.
4. Blinking Green Light means power is on and not connected via Bluetooth.
5. To turn power off, hold power button down for 5-8 seconds.

Power Off

Power On

C. **Charging Procedure**

Connecting charger to phx21™:

1. You will need a phx21™ charger (see Figure 1).
2. Turn off phx21™.
3. Remove blue protective cap over charging port by turning cap counter clockwise (Figure 2).
4. Align groove in charger with grove in charging port (Figure 3).
5. Plug charger into phx21™ (Figure 4).
6. Tighten by turning collar on charger cable clockwise (Light on charger will flash when connection is successful).
7. The light should blink until battery is charged, once charged the light will remain solid.

Figure 1

Figure 2

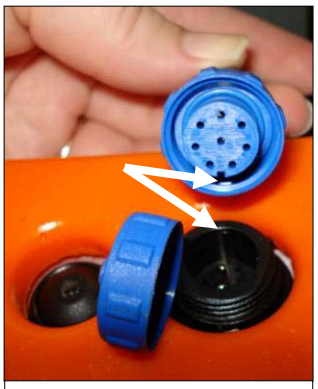


Figure 3

Figure 4

Note: Blue protective cap **MUST** be in place when phx21™ is in use in a hazardous area.

To power phx21™ with a charger:

1. Connect Charger. The Battery will not charge while the pump is on.
2. phx21™will run as long as h2 is available.
3. If phx21™ is turned off (pump or power) the charge will see an increase in voltage and think the battery is charged.
4. To charge battery, power down phx21™, then unplug the charger for 5 seconds and then plug it back in.

D. **Changing Inlet Filter**

Replacing Inlet Filter:

1. This is what the Inlet Filter / Probe Port looks like intact (Figure 1).
2. To remove Inlet Filter Assembly (Figure 2) turn counter-clockwise.

NOTE: Replacement O-rings available on www.storeldar.com.

3. Remove Inlet Filter from Inlet Filter Assembly make sure that the o-rings (CF stem o-ring & Probe o-ring) on either side are in good condition (no cracks or tears) (Figure 4).
4. Replace Inlet Filter.
5. Screw Inlet Filter Assembly clockwise into phx21™.

Figure 1

Figure 2

Clean Inlet Filter

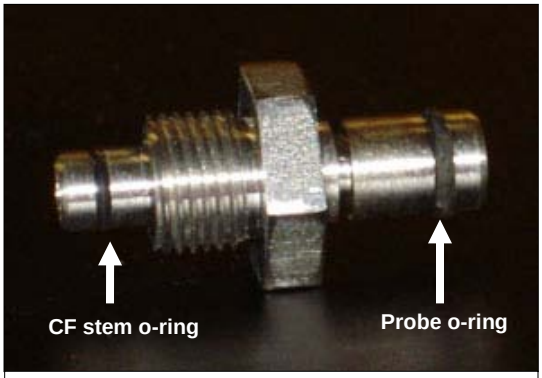


Figure 4

E. Replacing Probe Tip Filter / Connecting Probe

Replacing the Probe Tip Filter:

1. The Probe Tip Filter is located between the Teflon Tubing and the Probe (Figure 1).

NOTE: The Probe Tip Filter must always be clean. If you notice any dirt, metal or water trapped in the Probe Tip Filter replace it immediately.

2. To insert a new Probe Tip Filter first attach the Teflon Tubing (Figure 2).
3. Next attach the Probe (Figure 3).

NOTE: the Probe Tip Filter must be in place at ALL times when the phx21™ is running.

Figure 1

Figure 2

Figure 3

Connecting the probe to phx21™:

NOTE: Probe must be connected before igniting the phx21™

1. To connect the probe to the phx21™ snap the Probe's Quick Connect Cable into the Inlet Filter / Probe Port (Figure 1).
2. To disconnect the probe from the phx21™ press the tab in toward the cable and pull out gently.

Inlet Filter / Probe Port

Figure 1

F. **Removing Flame Arrestor**

Removing the Flame Arrestor:

1. To remove the FID Assembly (Figure 1) insert the Flame Arrestor tool into the large groove across the center of the Assembly and turn counter-clockwise.
2. When the FID Assembly has been removed you should see a white Teflon Gasket in place inside the FID port (Figure 2).
3. Re-insert the FID Assembly into the FID Port and hand-tighten clockwise.

Figure 1

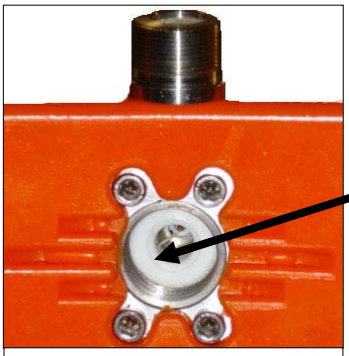
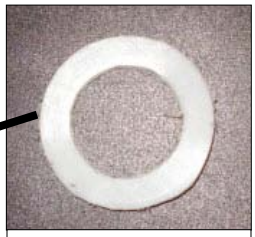


Figure 2



Teflon Gasket

Section 3 Level 1 phx21™ Repair

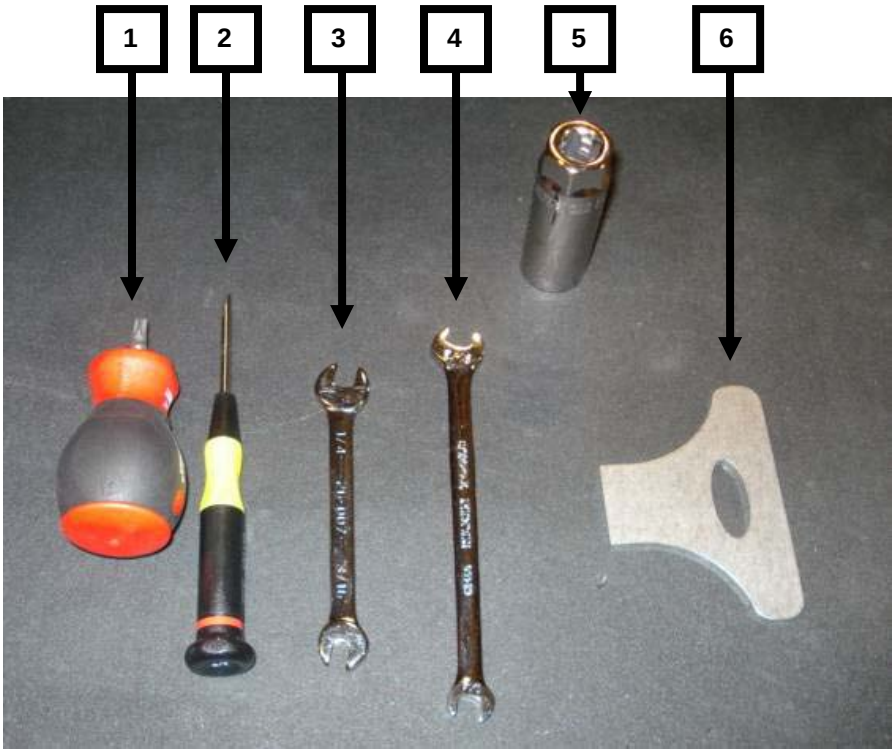
LDARtools Specialists are available to provide Level 1 phx21™ Repair training. To schedule a training session contact an LDARtools Support Specialist at 1-877-788-1110 ext. 1 or support@ldartools.com.

IMPORTANT: Before any repairs are to be performed on site, you must Report an Issue using the LDARtools website, including sending log files, as well as going over diagnosis with LDARtools support personnel.

Please note that to protect the intrinsic safety of the phx21™ analyzer ONLY certified personnel may perform the repairs outlined below. Any repairs that cannot be performed based on the procedures in this manual must be authorized, in writing, by LDARtools management.

A. **phx21™ Tool Kit**

1. Tork Hex bit / Stubby Screwdriver
2. 1/6 inch Flat Head Screwdriver
3. Locknut / Fitting Wrench 3/16 inch and ¼ inch
4. Fitting Wrench 5/16 inch and ¼ inch
5. 5/8 inch Socket Wrench
6. Flame Arrestor Tool



B. **Opening phx21™ Case**

1. Unscrew the eight screws on the FID side of the phx21™ using the Tork Hex bit / Stubby Screwdriver.

2. Once all eight screws are removed, lift off the orange end plate.
3. Remove Battery (See Battery Replacement Section for details).
4. Lay phx21™ on its side.
5. Grasp connections end plate with one hand and firmly pull on black case with the other hand.

6. To re-assemble the case slide black casing back on.

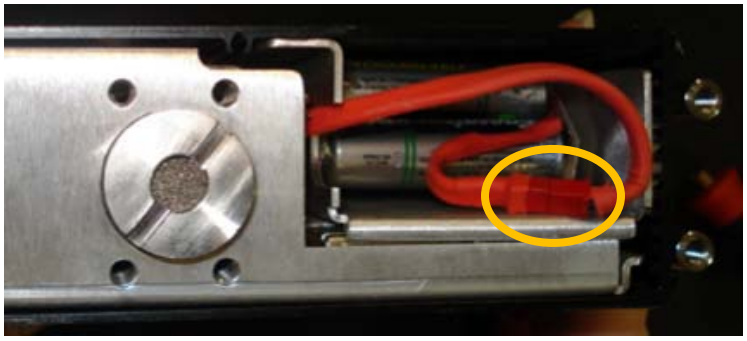
NOTE: Watch for battery cable and use ruler to move tubing or wires aside if they are interfering.

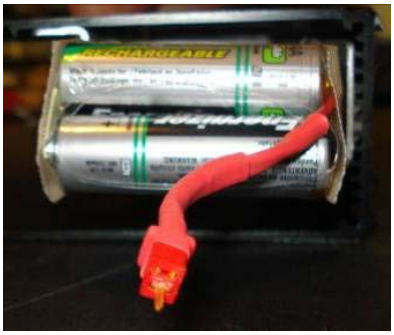
NOTE: Make sure all four metal rods are on the outside.

7. Once black case is in place, replace the FID end plate.
8. Replace screws.
    - The four outer screws are Tork screws with a rounded head (left picture).
    - The four screws around the FID Assembly are flat head screws (right picture).

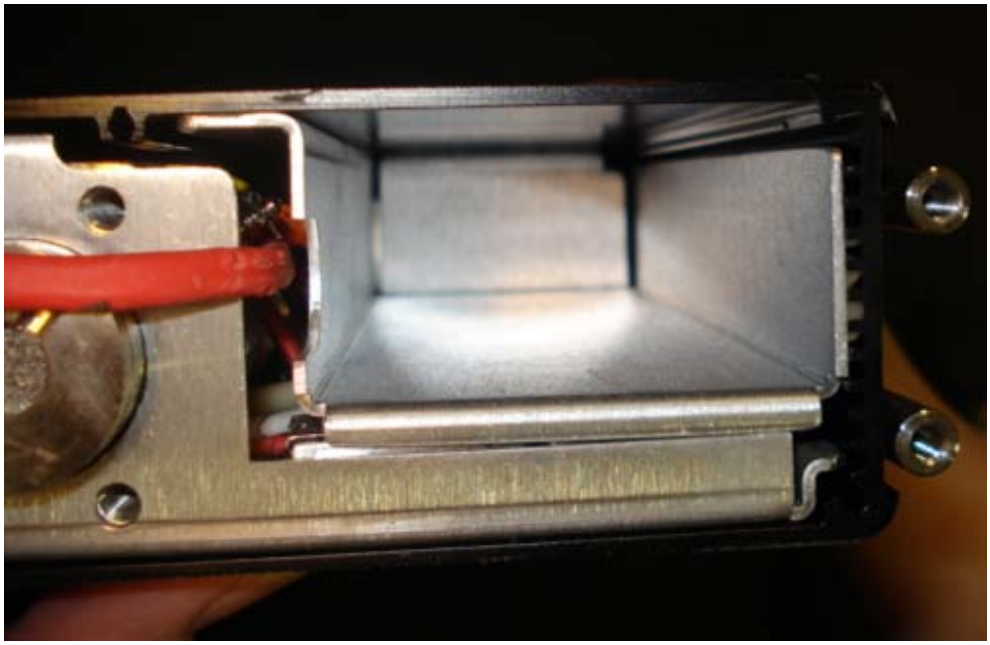
C. **Battery Replacement**

1. Begin by removing the FID end plate.
2. Remove Foam.
3. Grasp the red cord and carefully disconnect the battery pack.





4. Slide battery pack out of the case.



5. Replace battery.
6. Slide new battery into the case.
7. Reconnect battery cable.
8. Replace Foam.
9. Replace FID end plate.

D. **Probe Flow Pressure Adjustment**

1. On PDA launch phx21™ software.
2. *Tap* **Menu.**
3. *Tap* **Pump On/Bypass**.
4. Using the 3/16 inch wrench rotate the locknut counter clockwise to loosen (Picture **A**).
5. Use the flat head screwdriver to turn stem and adjust probe flow (Picture **B**).
   - o Target is 1.25Lpm +/- .25Lpm.
   - o Turn clockwise to decrease flow.
   - o Turn counter-clockwise to increase flow.

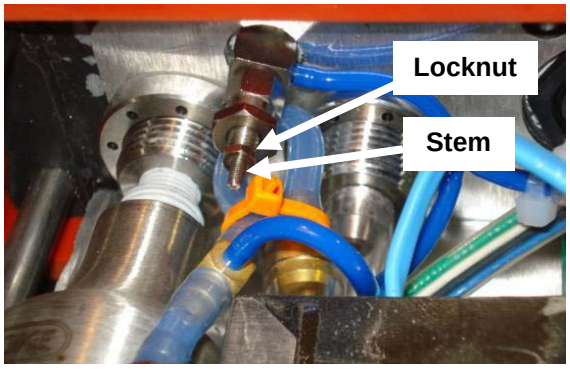
NOTE: When making adjustment to the flow, turn stem very slowly to achieve 1.25Lpm +/-.1Lpm.

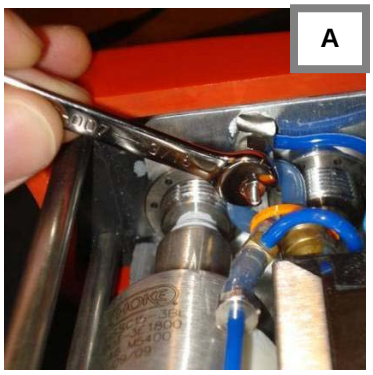
6. Check flow meter to assure flow has reached an acceptable range.

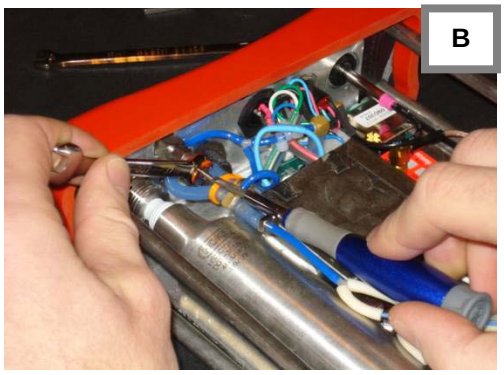
NOTE: Pump power level when adjusted to 1.25Lpm should be lower than 85%, if not contact support at 1-877-788-1110 ext. 1 or support@ldartools.com.

7. Tighten locknut with screwdriver still in place.
8. Check flow.

Flow Meter

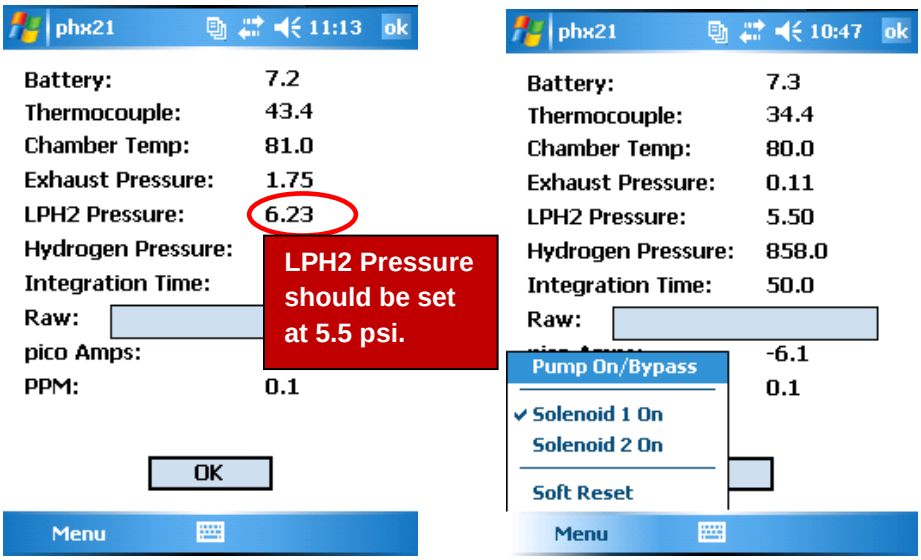




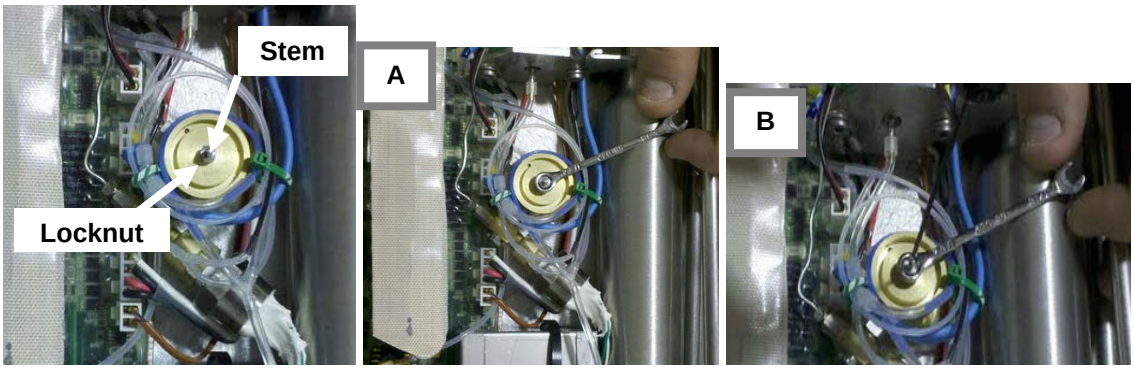


E. **LPH2 Pressure Adjustment**

1. On PDA *launch* **phx21™ software**.
2. Select phx21™, connect and run.
3. *Tap* **Menu**.
4. *Tap* **Details**.
5. *Tap* **Solenoid 1 On** (Make sure there is a checkmark).
6. *Locate* the **LPH2 Pressure** reading on the PDA screen.



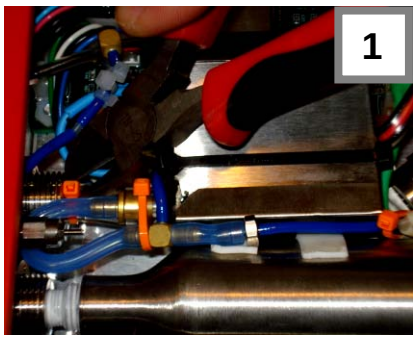
7. Using the 3/16 inch wrench rotate the locknut counter clockwise to loosen (Picture **A**).
8. Use the flat head screwdriver to turn stem and adjust pressure (Picture **B**).
   - Target is 5.5 psi +/- .1 psi.
   - Turn clockwise to increase pressure.
   - Turn counter-clockwise to decrease pressure.
9. Toggle Solenoid 1, 5 times.
10. Toggle Solenoid 2, 5 times.
11. Turn on Solenoid 1.
12. Check, readjust if needed repeat step 8.
13. Watch PDA screen to see when pressure reaches the acceptable range.
14. Tighten locknut.

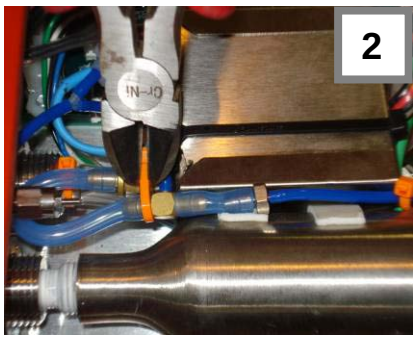


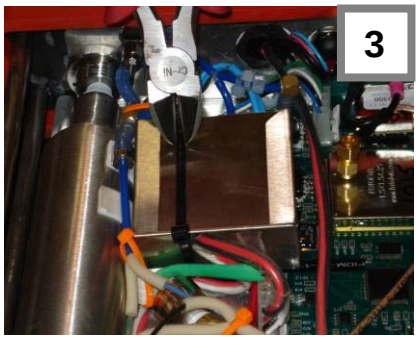
F. Pump Replacement

To Remove the Pump:

1. Cut the three zip ties holding the pump in place (see illustration below).

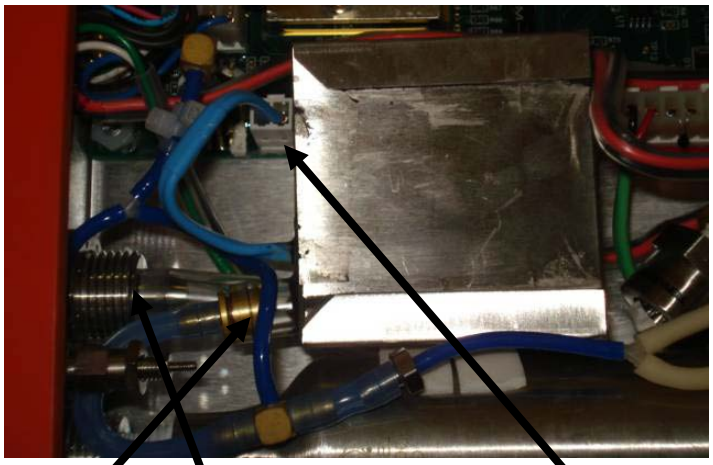


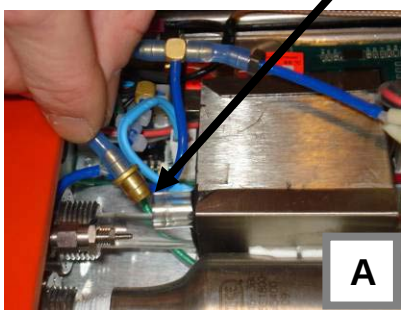


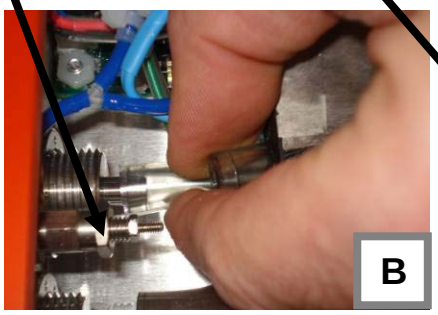


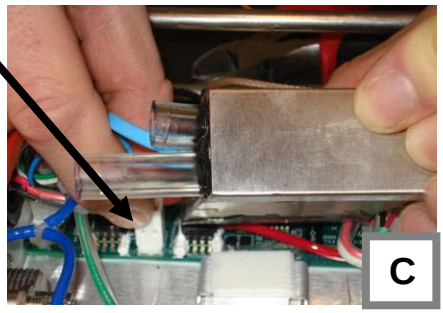
2. Once all the Zip ties are removed begin disconnecting the pump.
3. Use the flat head screwdriver to work the gold reducer/adapter loose from the small teflon tubing (picture A).
4. Gently pinch the large teflon tubing attached to the pump and pull back (picture B).
5. Lift the pump with one hand and disconnect the white connector (picture **C**).

NOTE: DO NOT pull on the wire, grasp the hard plastic connection.

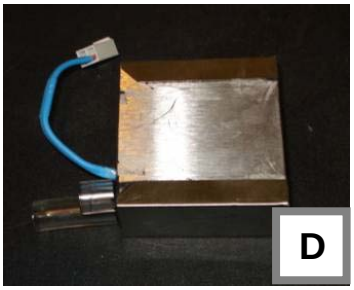


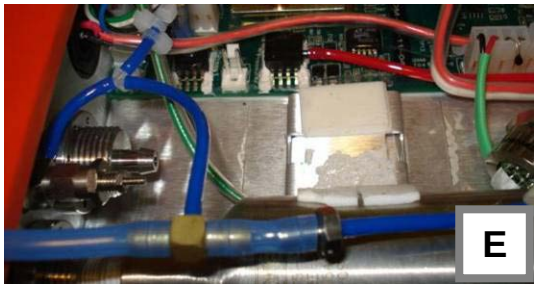




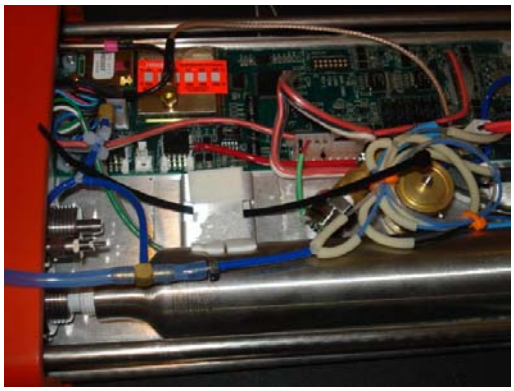


6. When you have finished disconnecting the pump it will look like picture **D**.
7. The pump base should look like picture **E**.

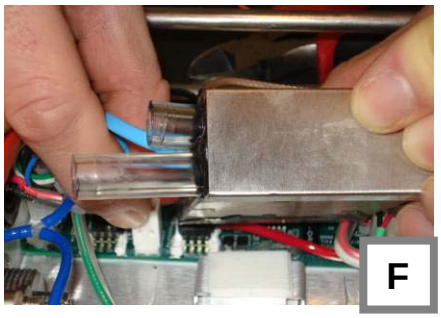


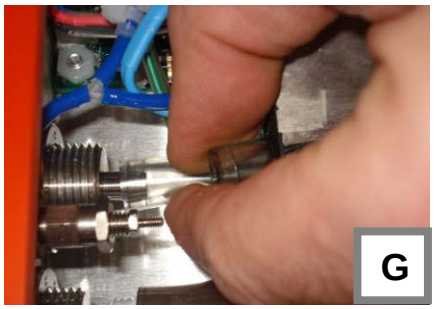


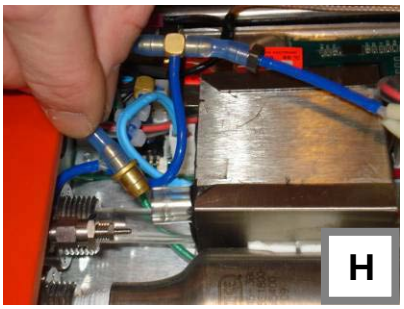
8. Thread a zip tie under the pump base.



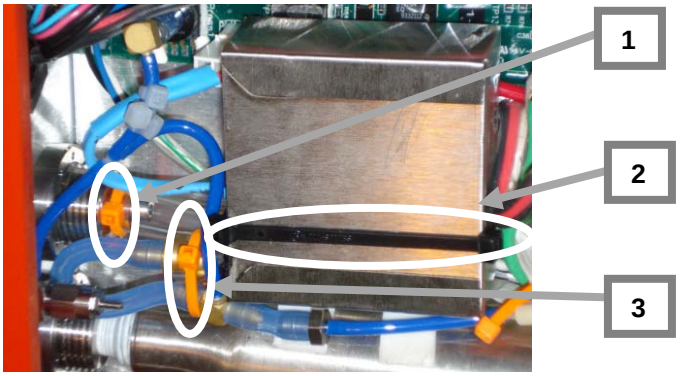
9. Re-attach the white connector (picture **F**).
10. Slide the large teflong tubing attached to the pump back into place (picture **G**).
11. Re-attach the gold reducer/adapter to the small teflon tubing (picture **H**).







12. Replace all three Zip ties and trim excess.



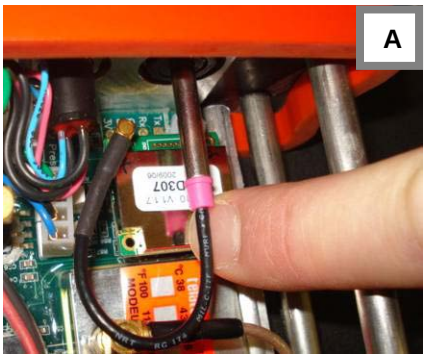
13. Adjust probe flow.

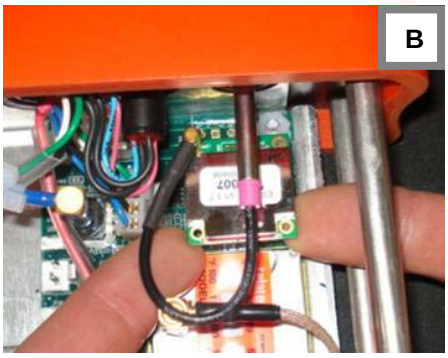
G. Bluetooth® Replacement

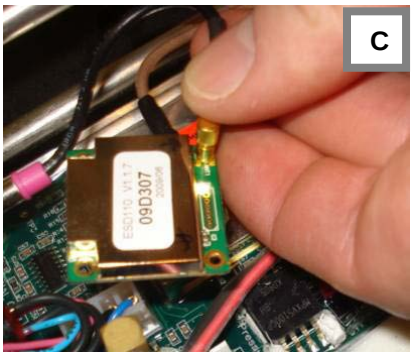
1. Locate the Bluetooth® Device - near the Antenna (picture A).
2. Place one finger on either side of the device and gently pull straight up (picture B).
3. Turn until the cable has straightened (picture C).
4. Remove cable and discard Bluetooth® Device.
5. Obtain new Bluetooth® Device.

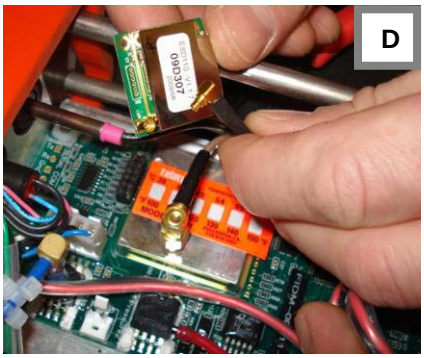
NOTE: Bluetooth® Devices must be ordered from www.storeldar.com as they are pre-programmed for use with phx21™.

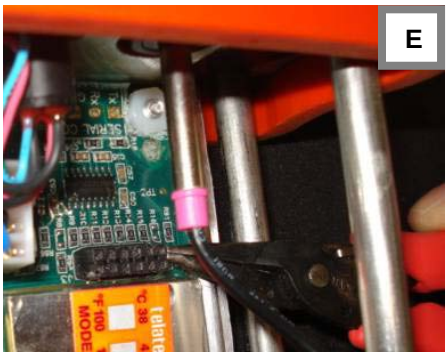
6. Attach cable to new Bluetooth® Device (picture D).
7. Rotate Bluetooth® Device so that the pins align with circuit board inside phx21™ (See **circuit board base** in picture E).
8. Press down gently until pins make connection (picture F).





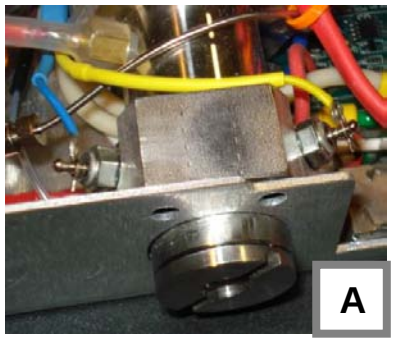


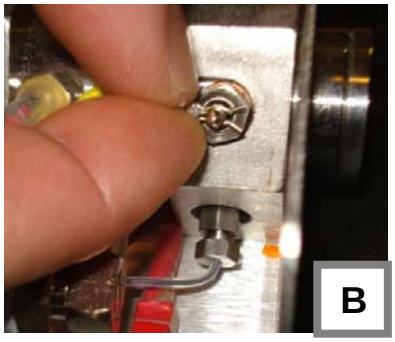


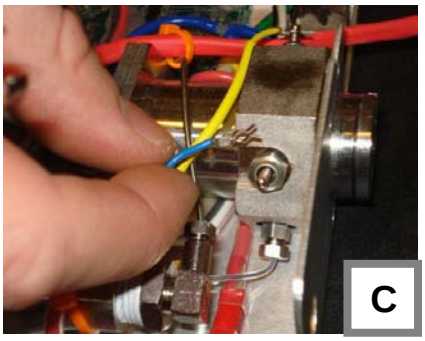


H. Glowplug Replacement

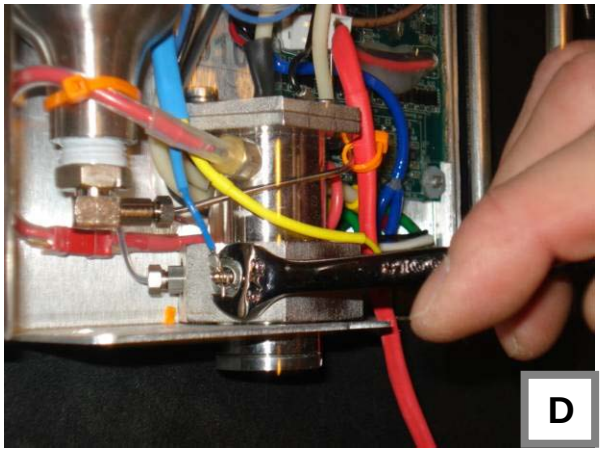
1. Glowplugs are located on either side of the FID Assembly.
   - o Yellow is the primary wire.
   - o Blue is the secondary wire.
2. To replace glow plug grasp base of metal pin and pull back (Picture **B** & **C**).

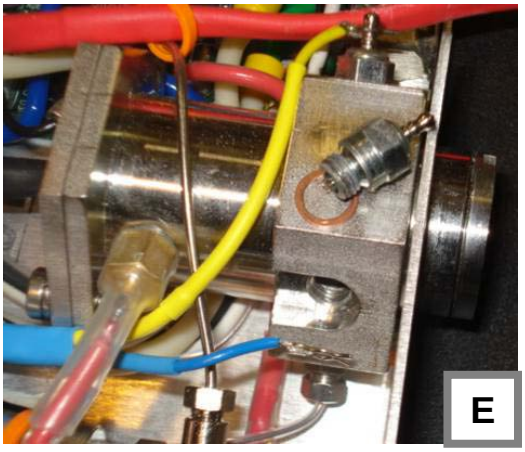






3. Use 5/16 inch wrench to turn Glowplug counter-clockwise to loosen (Picture **D**).
4. Use fingers to unscrew the rest of the way (Picture **E**).





5. Replace Glowplug by tightening clockwise.

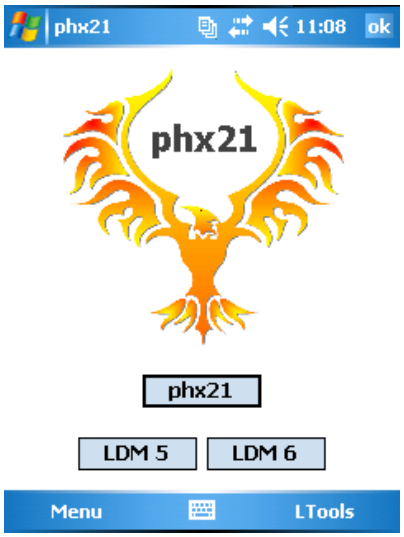
NOTE: Ensure that washer is in place before inserting Glowplug.

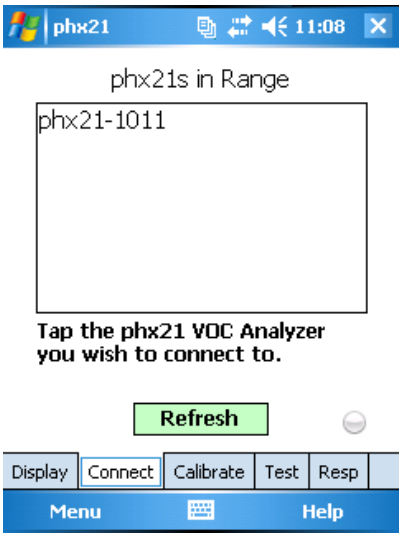
6. Reconnect wire.

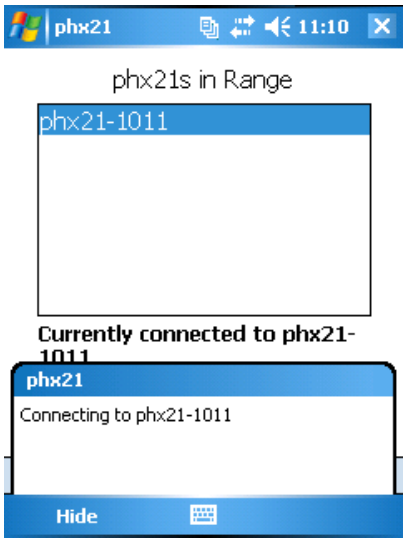
Section 4 Daily Connection / Calibration

A. **Connect PDA to phx21™**

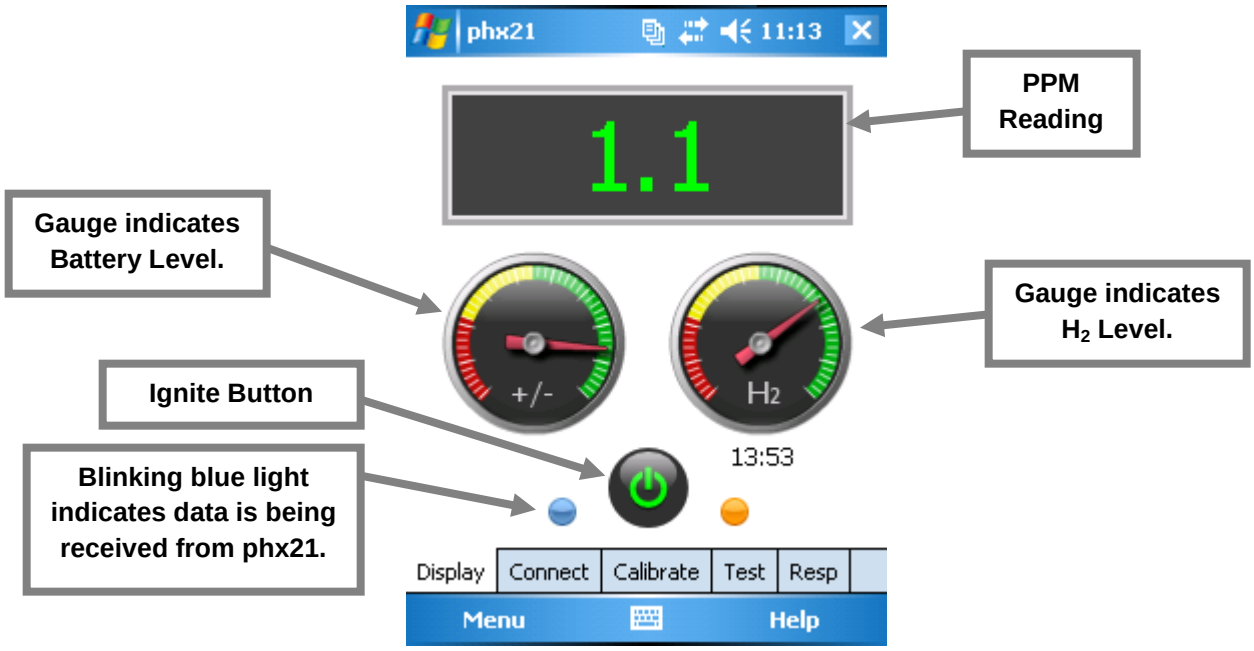
- To launch the phx21™ software:
- *Tap* the Start Menu.
- *Select* **phx21** from the drop list.
- You will be taken to the phx21™ home screen (pictured below).
- *Tap* the **phx21 button**.
- You will be taken to the connect tab.
- The software will load a list of all phx21™s in range.
- *Tap* on the **phx21™** you wish to connect to.
- Connecting message will be displayed.
- Once connection is complete, you will be directed to the Display Tab.







B. **The Display Tab**

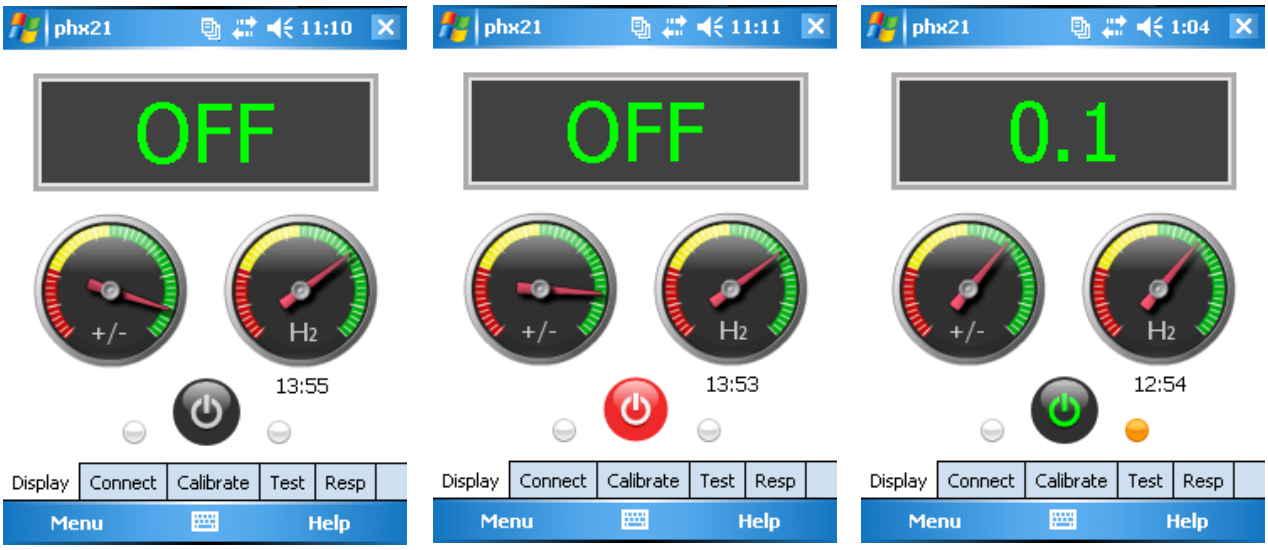


C. **Igniting phx21™**

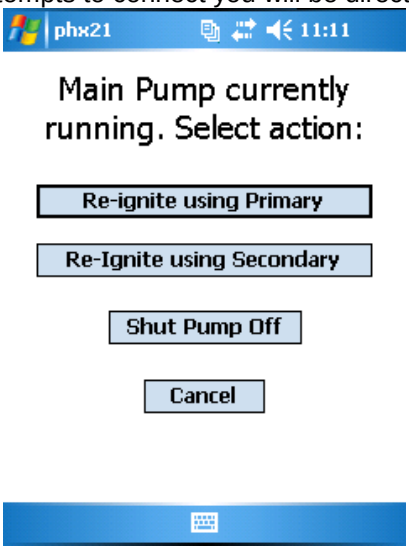
1. From the Display tab:
   - o *Tap* the **Ignite Button**.

NOTE: When the ignite button turns red, STOP, wait until the button has a green center or turns grey again to proceed.

- o phx21™ will attempt to ignite.
  - Ignition **successful** button will turn **green** in the center.
  - Ignition **unsuccessful** button will turn **grey** again.



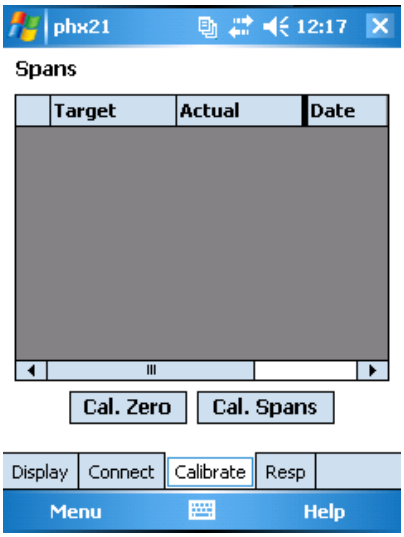
- o After a few unsuccessful attempts to connect you will be directed to this screen:

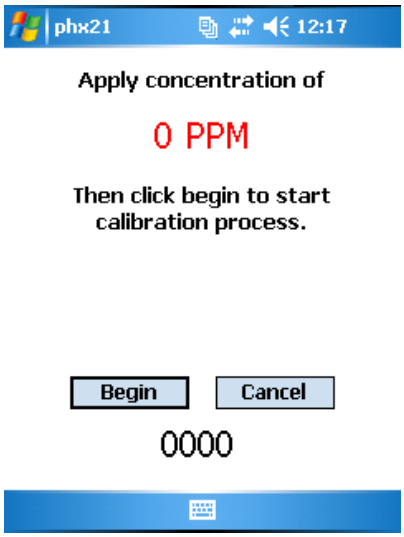


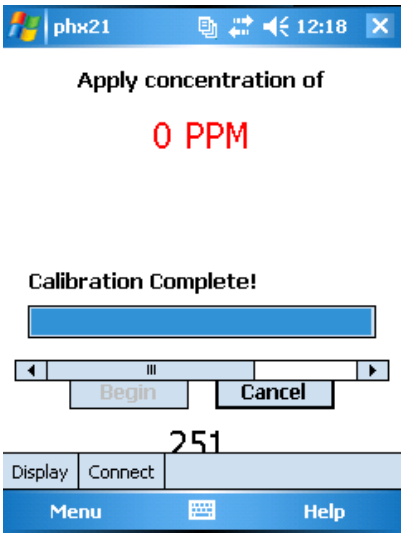
- o *Tap* **Re-ignite using Primary** or **Re-Ignite using Secondary**.
- o If you are still unable to ignite the phx21™ contact LDARtools Technical Support (support@ldartools.com or 1-877-788-1110 ext. 1).

D. **Manual Daily Calibration for phx21™**

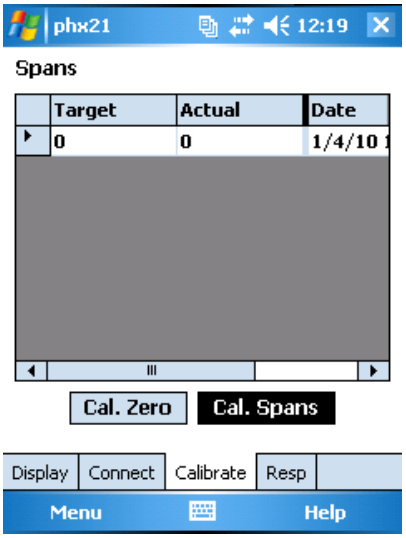
1. From the Calibration tab:
   - o *Tap* the **Cal. Zero** button**.**
   - o Apply concentration of Zero Gas for 5 seconds.
   - o *Tap* the **Begin** button.
   - o phx21™ will sample the gas two times and then display Calibration Complete Message.

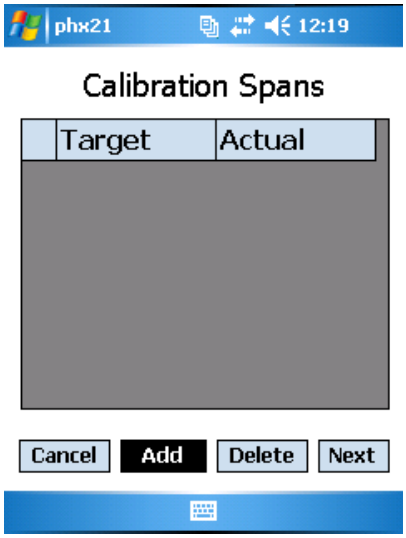


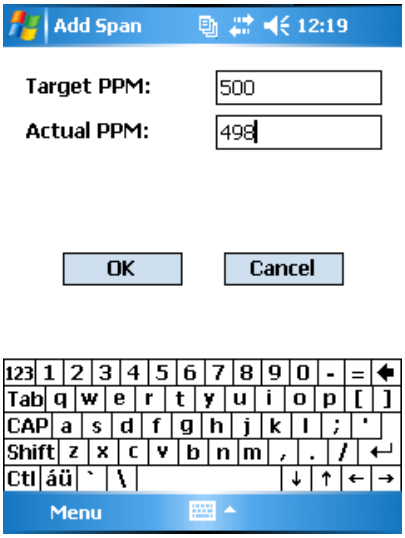




   - o Return to previous screen.
   - o *Tap* the **Cal. Spans** button.
     - (a) *Tap* the **Add** button.
     - (b) *Enter* **Target PPM** for Span Gas.
     - (c) *Enter* **Actual PPM** for Cylinder.
     - (d) *Tap* **OK button**.

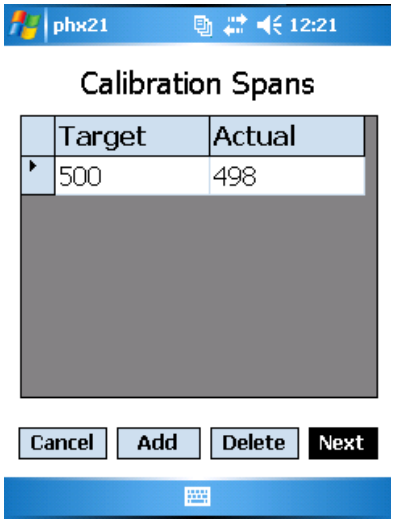






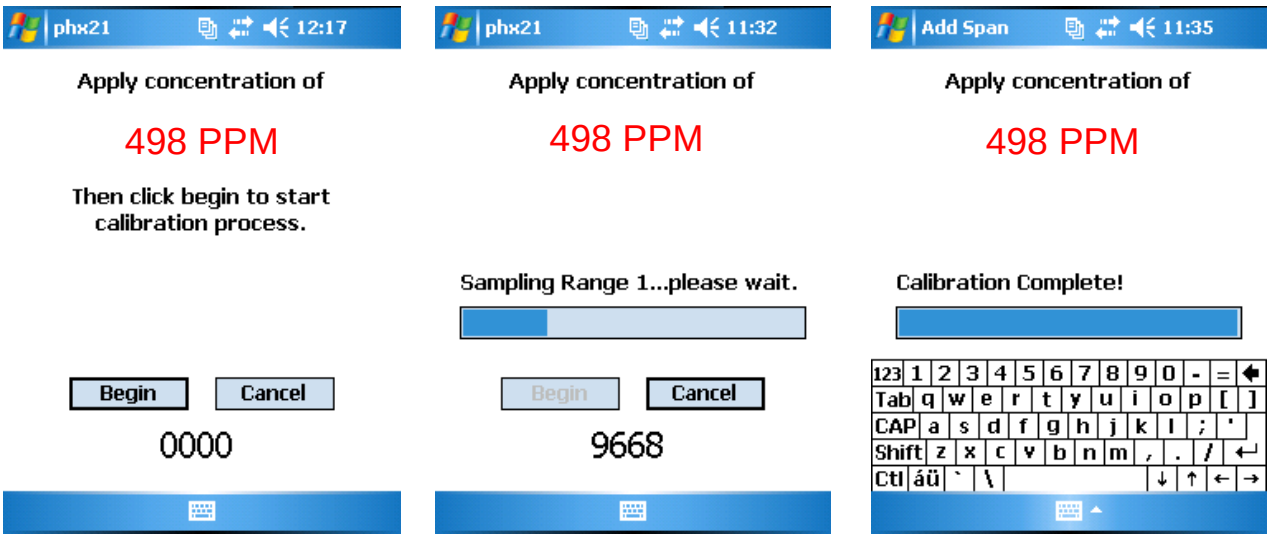
   - (e) Repeat steps a-d until all Calibration Spans have been added.

- Once all Calibration Spans have been added *tap* **Next**.



- *Apply* **Span Gas** to probe for 5 seconds.
- *Tap* **Begin**.
  - phx21™ will sample all Calibration Spans entered 3 times automatically.
- **Progress Bar** will indicate **Calibration Complete** phx21™ is finished sampling gasses.

NOTE: This process must be completed for all Span Gases each day. Do NOT delete Span Gases entered on previous days.



E. Daily Calibration Reports

- phx21™ does not automatically create Daily Calibration Reports when manually calibrated.

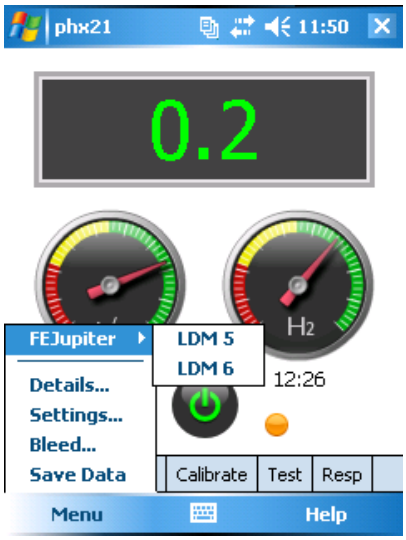
NOTE: If you were previously using Cal2.0™ at your site contact an LDARtools Technical Support Specialist (support@ldartools.com or 1-877-788-1110 ext.1) for assistance in adapting the reporting features for use with phx21™.

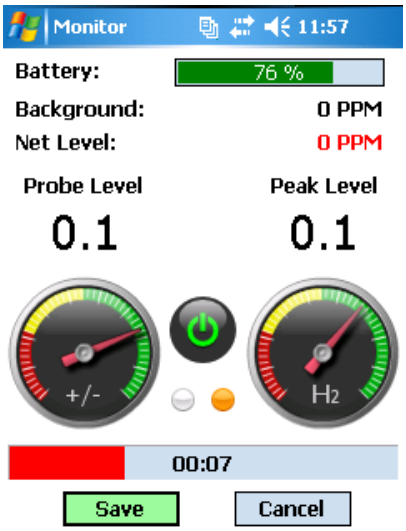
Section 5 Monitoring with phx21™

A. Monitoring with phx21™

1. *Tap* **Menu**.
2. *Select* **FEJupiter**.
3. *Select* **LDM 5** or **LDM 6** (Depending on which version of LeakDAS Mobile you are using at your site).
4. You will be directed to the normal FEInspect Monitoring Screen.

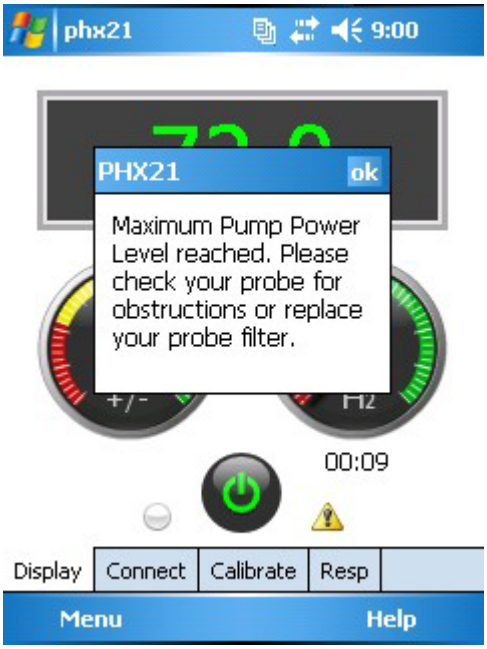
NOTE: phx21™ users will now have the Battery Gauge, H_2 Gauge, Power Button, Blue and Orange Lights visible on their Monitoring Screen.



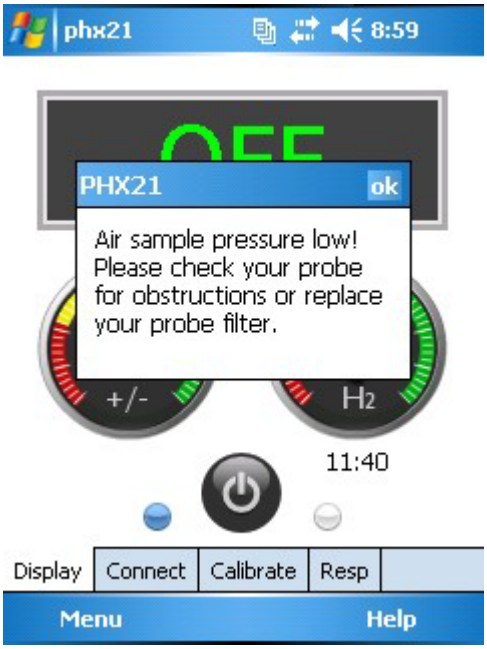


B. **Error Messages**

1. If air sample pressure is high due to a missing probe tip filter or a disconnected probe cable the following message will be displayed:



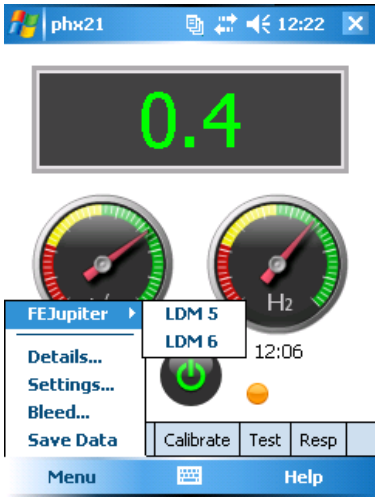
2. If Air sample pressure is low due to a dirty probe tip filter or a crimp in the probe cable the following message will be displayed:



Section 6 phx21™ Menu Options / Additional Information

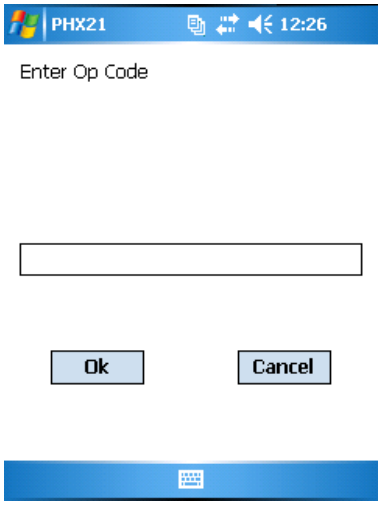
A. phx21™ Menu Options

1. To access the menu options:
2. *Tap* **Menu**.



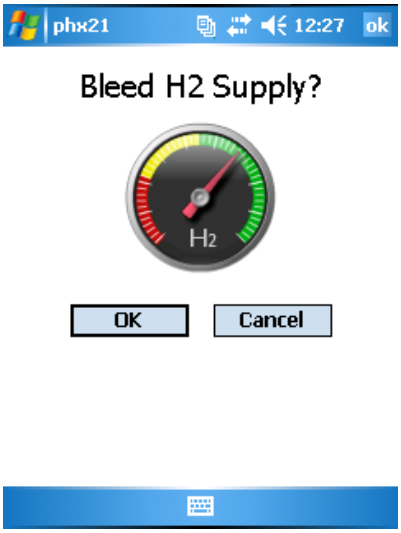
3. The **Details…** and **Settings…** menu features are only to be used with the direction of an LDARtools Technical Support Specialist.

NOTE: If you inadvertently access the Details/Settings Menu option you must close the on screen keyboard to view the OK and Cancel Buttons (see example below).

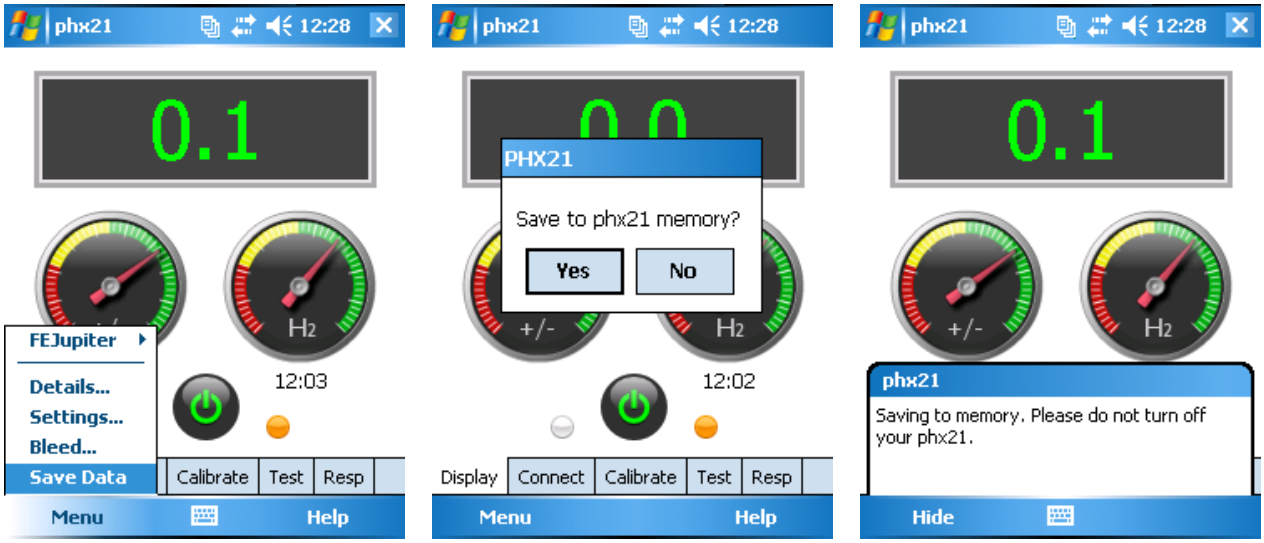


4. *Tap* **Bleed…** to access the screen to bleed/empty the H_2 bottle.

NOTE: You should only bleed the H_2 supply before transporting or shipping. There is NO NEED to do this at any other time.



5. *Tap* **Save Data** to save Data to phx21™ memory.



B. **Response Tab**

Response Tab is not currently used.