QMR Blasting Analysis ABN: 61 107 545 791 ACN: 107 545 791
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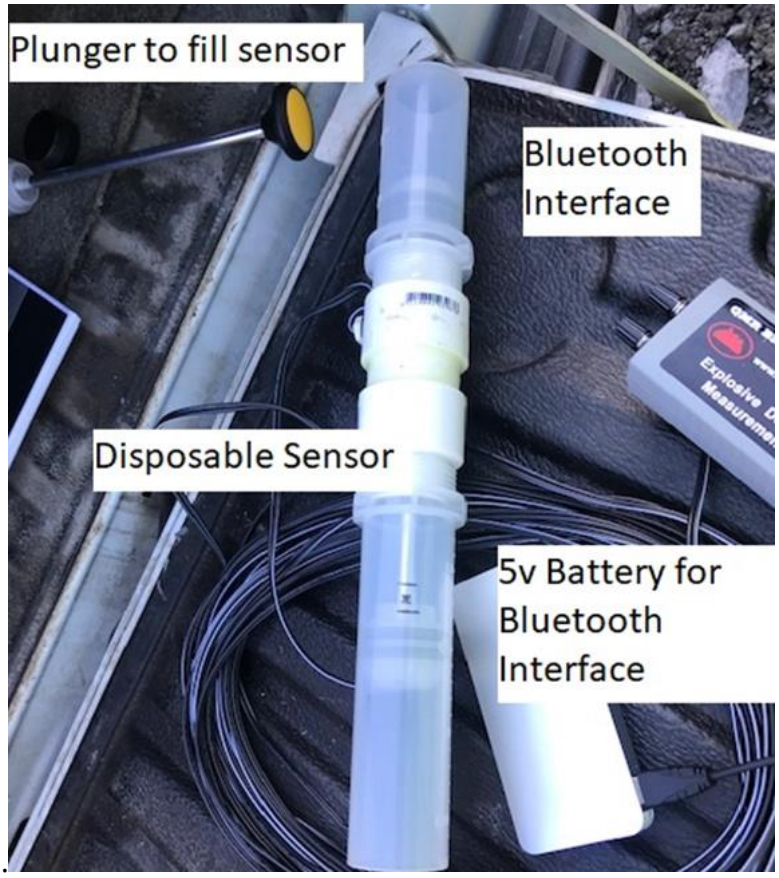
Explosive Density Tester MANUAL

"Density is the most important characteristic of bulk explosives; high density will prevent detonation and hence cause poor fragmentation and fume"

The Explosive Density Tester:

- Can be used in open-cut and underground mines
- Works at any hole depth
- Measures density at any position in the hole
- Placers no limit on operation time
- Can be used in wet or dry holes
- Allows measurement over sleep time
- Is set up and operated through a smart-phone application
- Sends readings to this smart-phone application via blue-tooth



Disclaimer
QMR Blasting Analysis is not responsible for, or accept any liability for, any loss, expense, damage of any type resulting from the use of the Density and Gassing Rate Tester and measurements obtained using the Density and Gassing Rate Tester.

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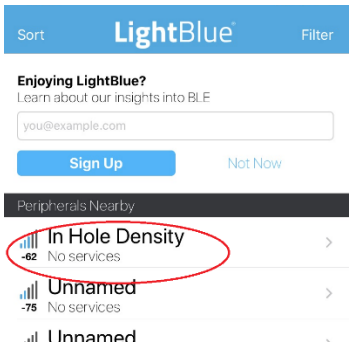
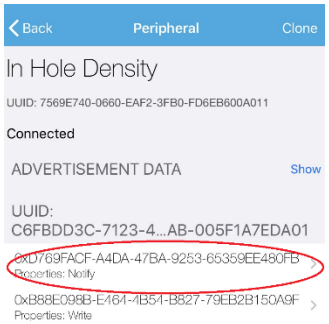
1. Download and install 'LightBlue' from the App store

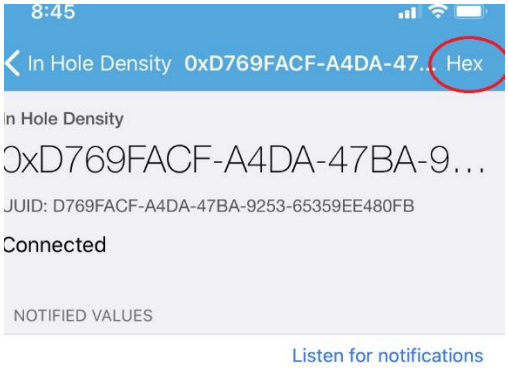
2. Plug Explosive Density Tester into a standard 5-volt USB power pack
3. Launch 'LightBlue' mobile phone app
4. Select 'In Hole Density'



5. Select 'Notify'



6. Select 'Hex'



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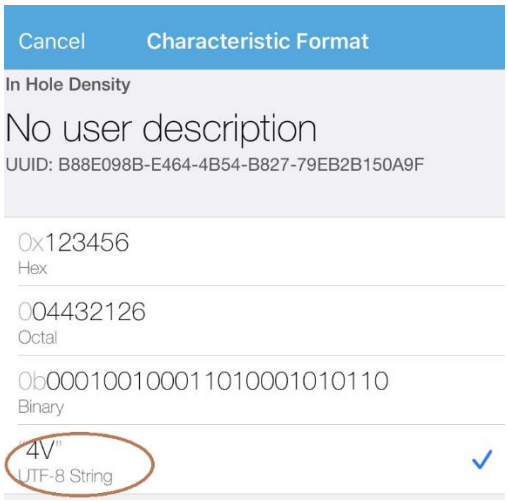
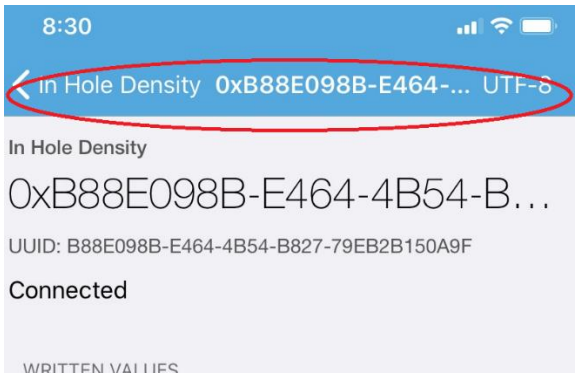
7. Select '4V' (so you see decimal numbers)



8. Press 'In-Hole Density' to go back



9. Take cup density measurement
10. Grease up syringe plungers with lubricant
11. Remove syringe body (top part) from sensor. Then insert the plunger.
12. To suck the product into the syringe: push the syringe down into the cup while pulling the syringe plunger up. *Do not twist the plunger*, as this will break the sensor.

IMPORTANT: Ensure there are **no air gaps** in the product. Air gaps will affect the accuracy of the reading.

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13. Suck the product in a further half inch (10mm) and wipe away any prills remaining on this exposed surface, as these will clog the seal of the sensor
14. Lubricate the other end of the plunger
15. Place some product in the hole in the end of the sensor plunger

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16. Fit full syringe onto sensor
17. Push the plunger in the short open tube section by hand, so the product is at just below the 150 mark.

18. Insert the cap into the syringe.

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19. Fill short open tube section with product

20. Before you put the sensor in the hole, plug the senor into the battery, and set the initial cup density using the App

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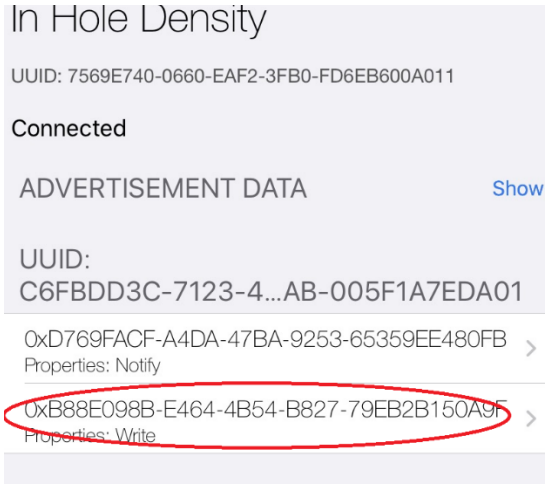
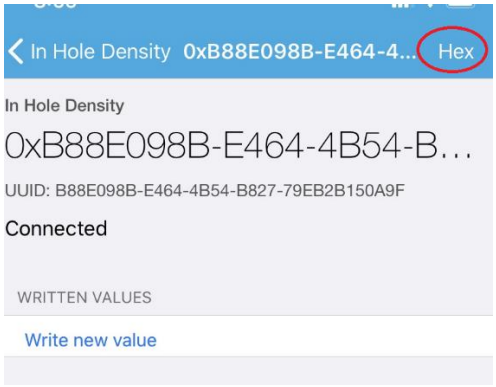
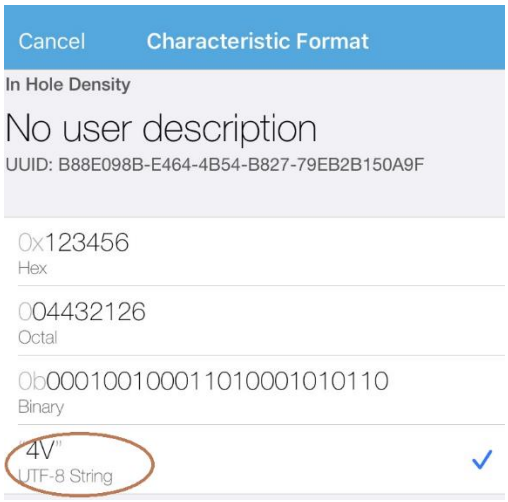
21. Select 'Write'



22. Select 'Hex'



23. Select '4V' (so you can see decimal numbers)



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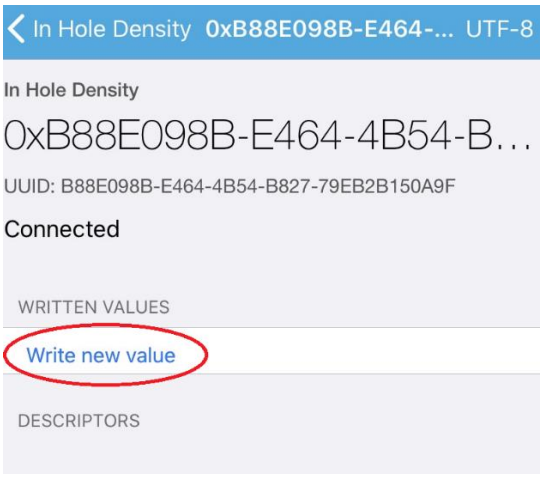
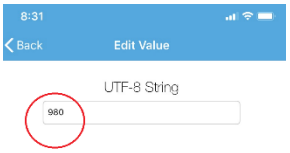
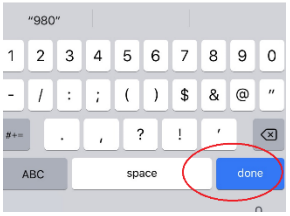
24. Select 'Write new value'



25. Type in the cup density and press 'done' on the keyboard. This value will be stored in the sensor. Set this number **before** putting the sensor in the ground, and **do not change this number after setting it.**





26. Select 'Notify'

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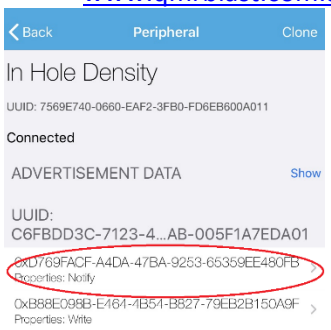
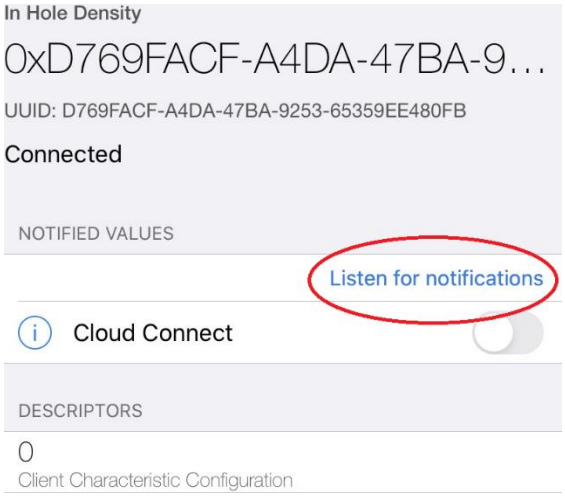


27. Select ‘Listen for notifications’



28. Place sensor in hole
29. Charge hole
30. Use phone app to monitor density

You can power up at any time to read the density – **do not write a new cup density value** (when this is done the current volume and density is stored and the readings will be changed to cup density and not the actual density.)

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After putting the sensor in the hole:

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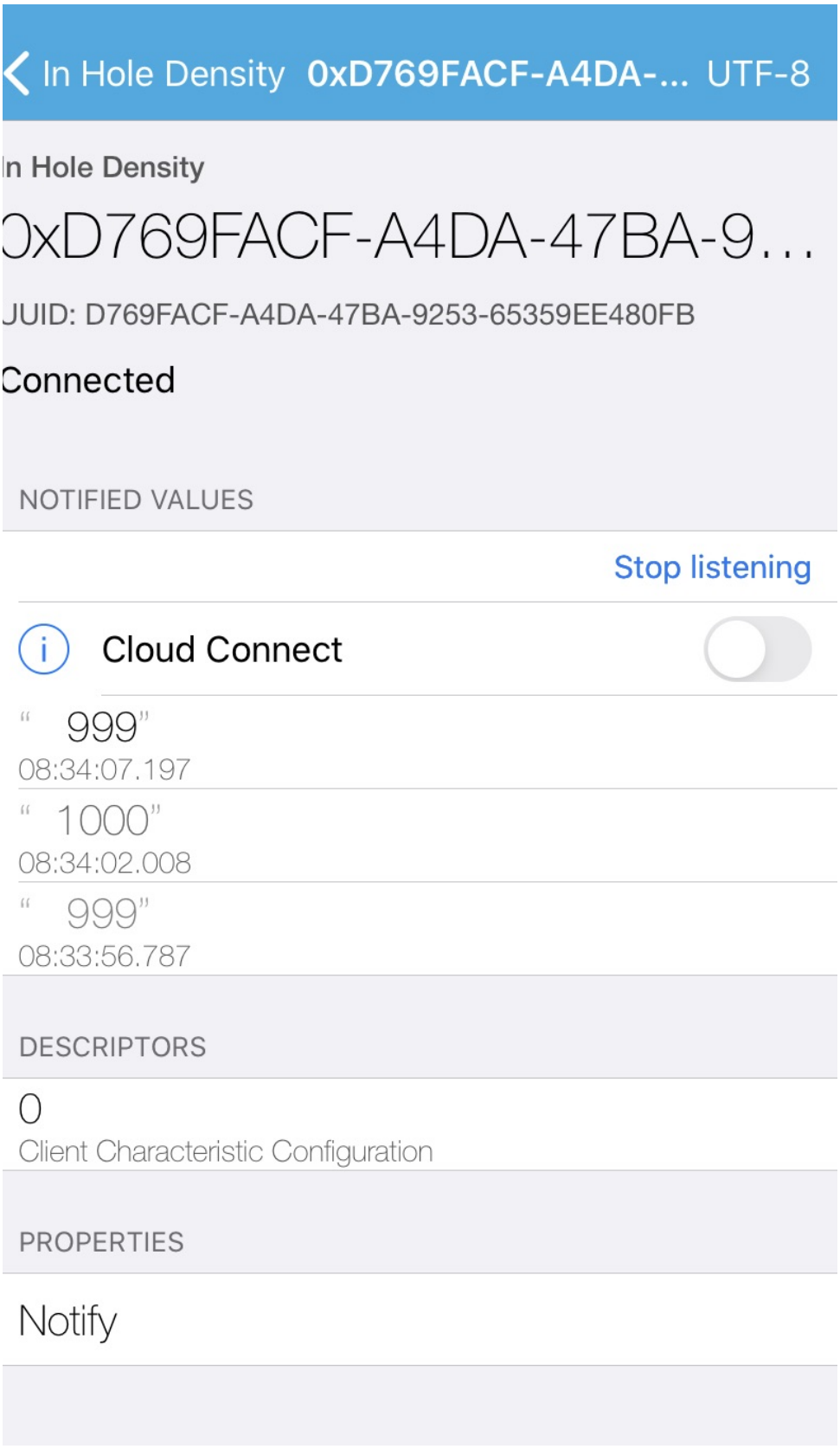
Monitoring the density of the hole using the app:



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