Cardinal PUMPS & EXCHANGERS
A Wabtec company

USER INSTRUCTIONS FOR TecSonics™ READER INSTALLATION ONTO EXISTING TecSonics™ PUMP

GET THE APP

DOWNLOAD THE TecSonics™ APP FROM THE APPLE APP STORE OR GOOGLE PLAY STORE FOR **FREE**.
SEARCH: TecSonics

CAUTION

IF YOU MAKE AN ERROR SETTING THE BASELINE IN THE READER, CONTACT YOUR UNIFIN OR CARDINAL REPRSENTATIVE FOR ASSISTANCE.

SET-UP

1. Your TecSonics™ reader will come preprogrammed with the pump information, such as serial numbers and location. The TecSonics™ baselines will have to be programmed by the user during installation onto the pump, as the process for setting the baseline requires a measurement to be taken to ensure the system is working correctly. Setting the baseline in the reader only has to be done once. Please see the section: **SETTING THE BASELINE** to learn how to complete this **one-time activity**.
2. To access the reader, you need a Bluetooth capable mobile device or tablet that uses the iOS or Android operating system and has the TecSonics™ App downloaded on to it.
3. The TecSonics™ App is **free** to download.
4. The mobile device or tablet only requires Bluetooth to operate the system. Wi-Fi and cellular data are **not** required to take and view readings.

OPERATION AND MAINTENANCE

1. We recommend taking measurements every 6 months for the first year or two, then once a year afterwards, using the instructions in this document.
2. As the connection between the App and the reader is based on Bluetooth Low Energy (BTLE) 5.4, and the process requires pressing a power button on the reader, readings must be taken by station personnel at the pump.
3. The readings are stored on the reader, so different station personnel can access the reader and its data, with different mobile devices.
4. The reader can hold 100 sets of readings. This equates to 75 to 100 years of data.
5. The password for the device is the same as Cardinal Pump's general phone number:

   3303328558

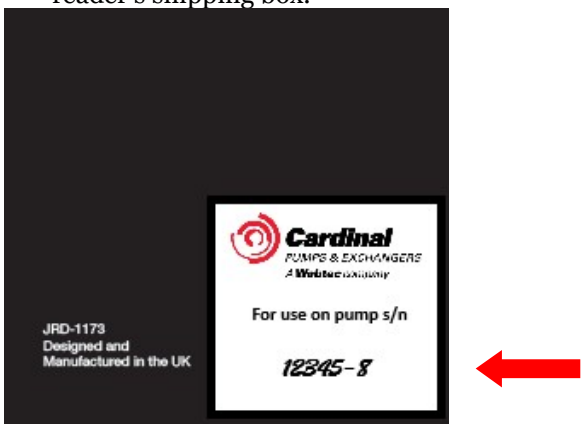
   If you wish to change this password, please contact your Cardinal or Unifin sales representative for instructions on how to do this. If you forget your password, the reader must be returned for processing.
6. The reader is an IP68 housing and has an expected battery life span of up to 10 years. Contact your Cardinal or Unifin sales representative if you require assistance in changing the battery. No other maintenance is required for the reader.
7. Updates to the App will be issued through the Apple App and Google Play stores like most other Apps secured from these stores.

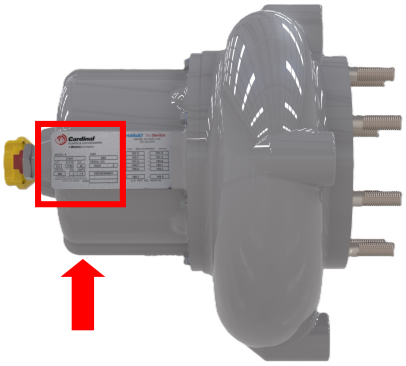
WARRANTY

1. App updates will be issued through the Apple App and Google Play stores like most other Apps secured from these stores.
2. The reader itself has a 12-month hardware warranty, and with most issues requiring replacement rather than repair. The reader must be returned within 30 days of a reported error under this warranty.

SETTING THE BASELINE

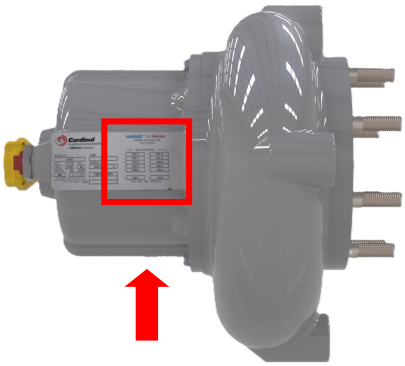
1. **VERIFY THAT THE READER PROVIDED MATCHES THE PUMP.**
   a. Compare the serial number of your pump matches the serial number written on the reader's shipping box.





2. LOCATE THE TecSonics™ BASELINE DATA FOR YOUR PUMP.

a. Locate the TecSonics™ baseline data for the pump you are working on. These can be found on your pump nameplate



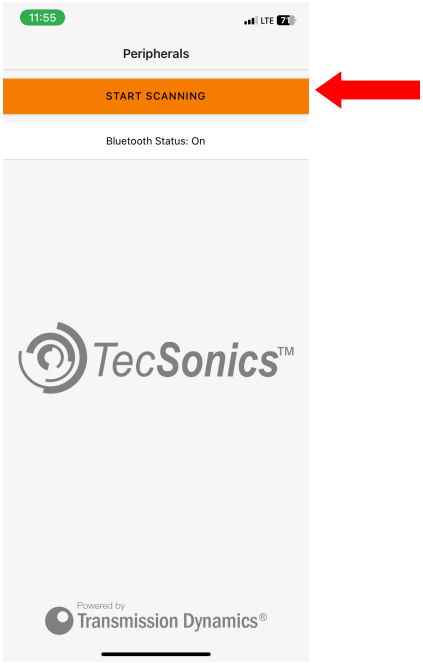
b. If your pump does not have baseline data on the nameplate, or the nameplate has been damaged, contact your Cardinal or Unifin representative for the baseline data. Have your pump serial number ready when calling.

3. CONNECTING TO THE READER

a. Physically install the reader onto your TecSonics™ pump as shown below.

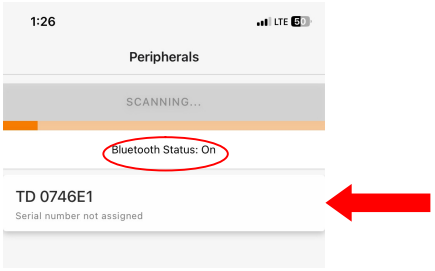
b. Ensure the Bluetooth on your mobile device or tablet is on. Then select the TecSonics™ App.

c. When you see the starting screen for the TecSonics™ App, tap on the "Start Scanning" button.

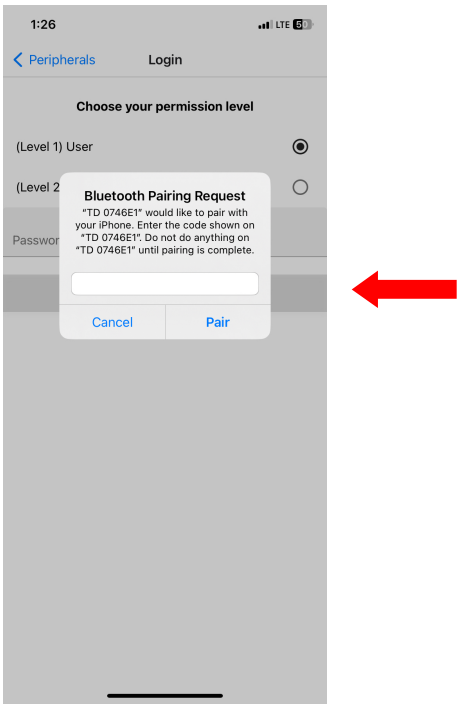


d. Press the power button on the reader. The button should have a flashing green circle and the words "Waiting for connection" on the reader's display screen, indicating it is ready to pair, just a like a set of Bluetooth headphones.

e. The reader should now be listed in the App. Each reader will have a unique address code. If no devices are shown, make sure the Bluetooth Status is “On”. If your Bluetooth is “Off”, shut down the app, turn on your Bluetooth, and restart. When the reader is shown on the list, tap on its listing.



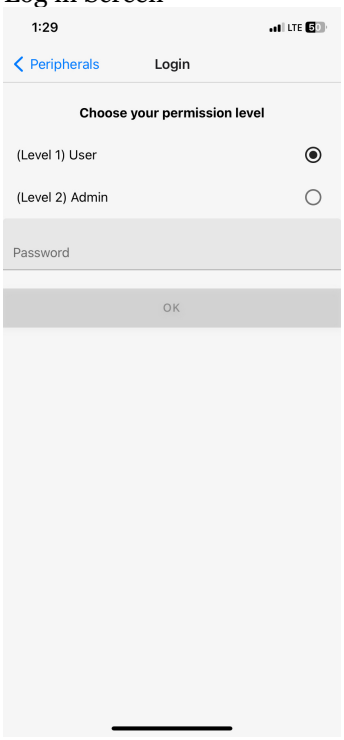
f. For a first-time connection, the reader will send a pairing code. Enter that in the dialog box on the app.



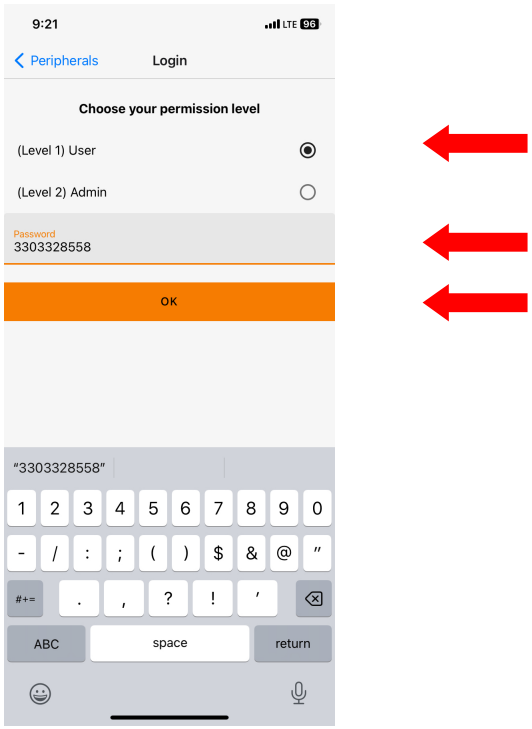
g. Your device should now be paired. The reader screen will be blank, and the power button will be a solid green. The App will display a log-in screen.

Solid Green

Log in Screen

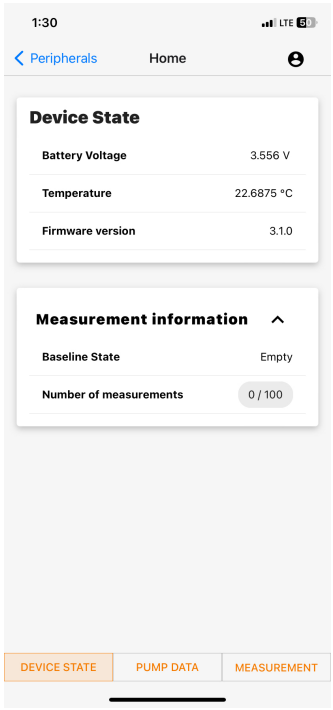


h. Tap on “(Level 1) User” and then enter the default password: **3303328558**. Tap “OK” when done.



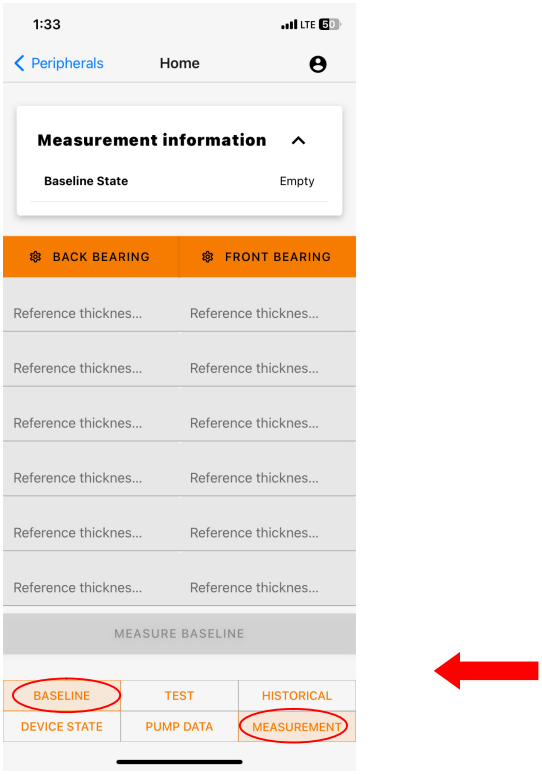
i. This should bring you to the DEVICE STATE tab on the screen. On this tab/screen you can see:
   i. battery voltage for the reader,
   ii. temperature of the reader
   iii. firmware version of the reader
   iv. status of the baseline
   v. number of measurements on the reader.

You are now connected to the reader.

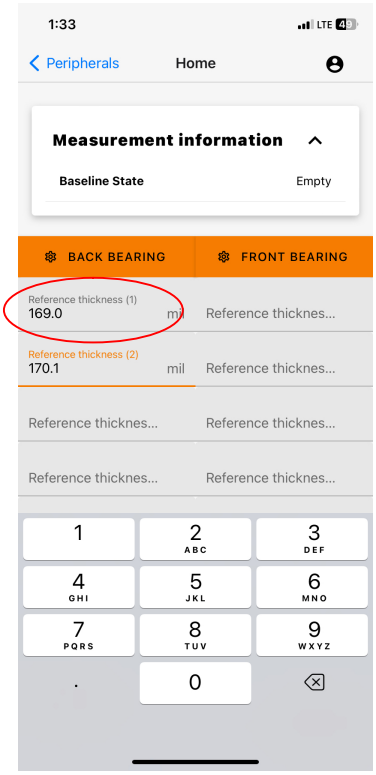


4. SETTING THE BASELINE

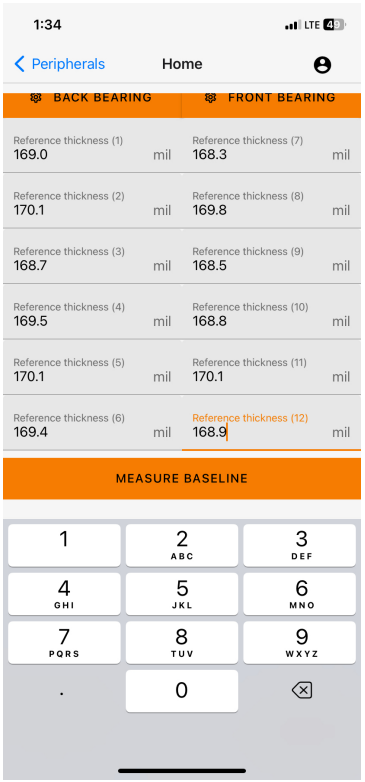
a. Tap on the MEASUREMENT tab at the bottom of the screen. This tab will then display three sub-tabs above the main row of tabs. Tap on the BASELINE tab.



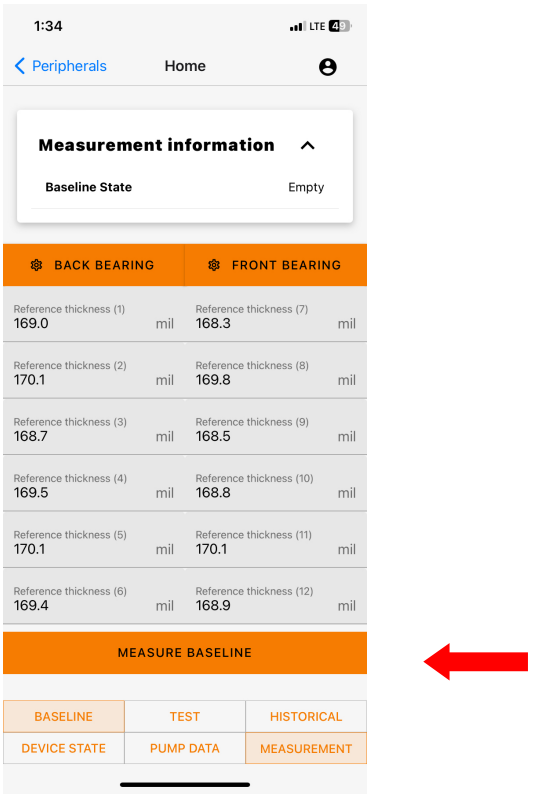
b. Under the orange title “BACK BEARING”, Tap on first blank line in the grey box to enter the baseline data for transducer 1.



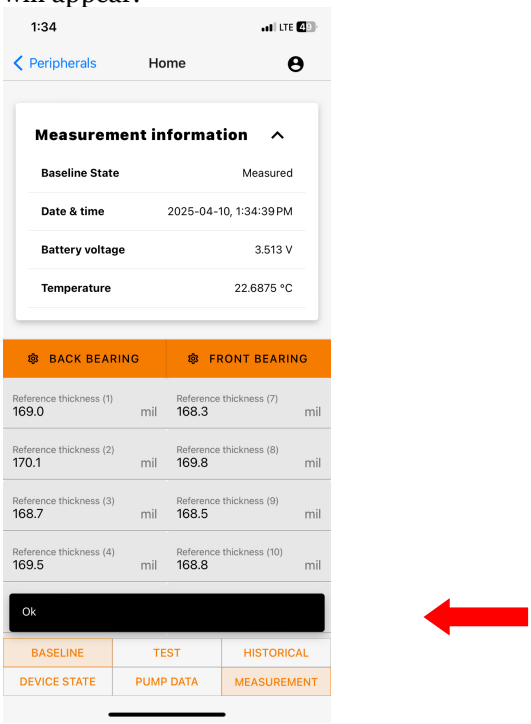
c. Enter the remaining baseline data for all twelve transducers. Transducers 1 to 6 are to be entered under the “BACK BEARING” title, and transducers 7 to 12 are to be entered under the “FRONT BEARING” title.



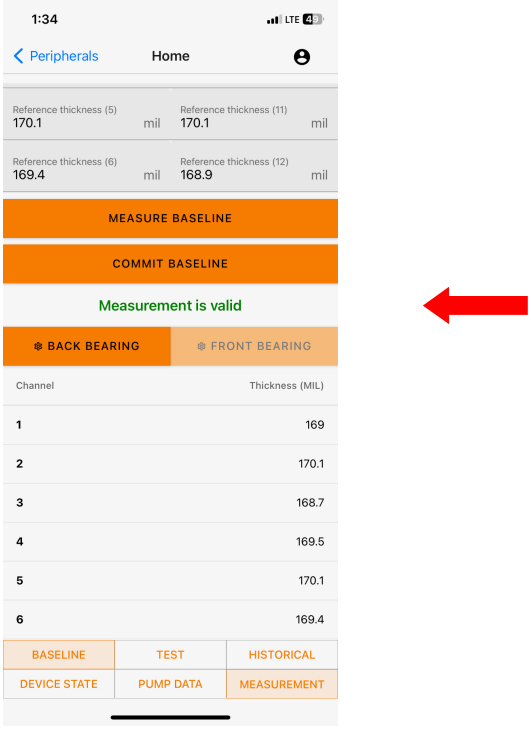
d. When you have finished entering the baseline data, tap on the “Measure baseline” button.



e. If the system can successfully send and receive a signal to the pump, a black bar at the bottom of the screen with the word “OK” will appear.

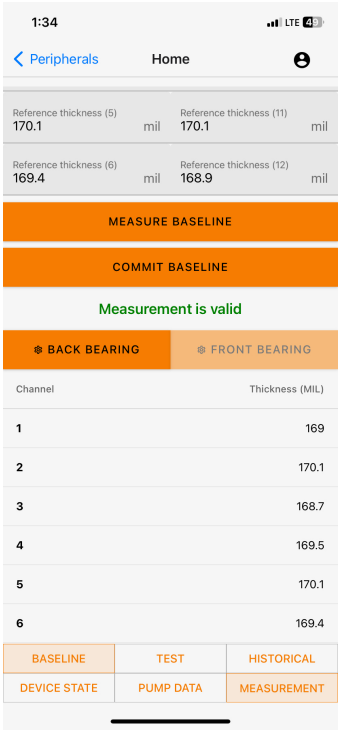


f. Scroll down to when you can see the “Commit baseline” button. Below this button will be a status display for the baseline. If the baseline has been properly entered and measured, the status display will show in green: measurement is valid. If there was an issue with the entry of data, or with measuring the baseline, the status will show in red: measurement is invalid.

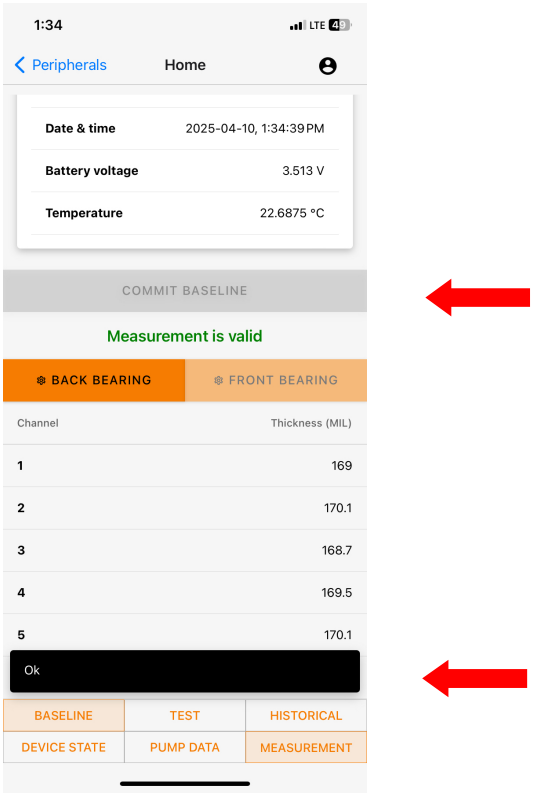


g. If the measurement is invalid, scroll up and check and correct any baseline data entries. If the baseline data entries are correct, scroll down to see if the measured readings match the ones you've entered. If a red circle is present, instead of a reading, then the system was unable to detect a return signal from that transducer, and it is what we call a "zero reader". This is an issue with the transducer, not evidence of bearing wear. It is possible to correct some transducers. Please contact your Cardinal or Unifin sales representative with your pump serial number for assistance.

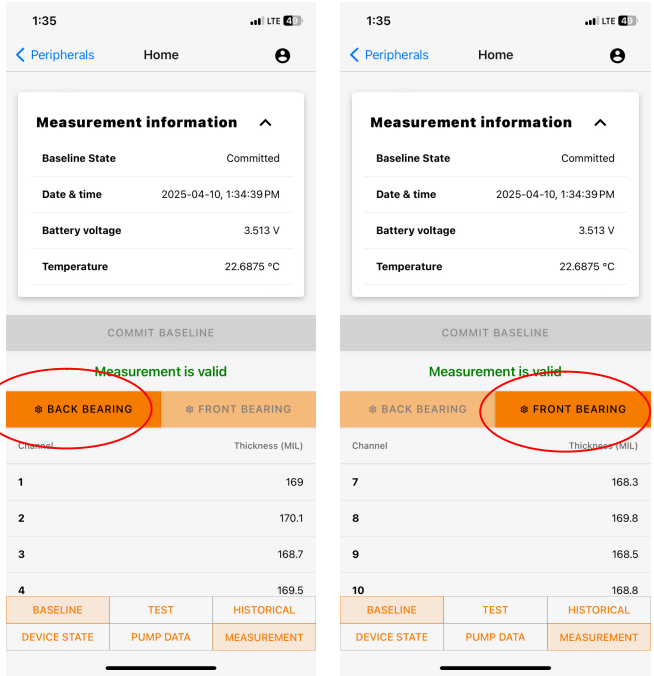
h. If the measurement is valid, press the "Commit baseline" button.



i. If the baseline is successfully committed, a black bar at the bottom of the screen with the word "OK" will appear. The options to measure and to commit the baseline will also no longer be available.



j. The pump baseline has been successfully entered into the reader. The baseline for each bearing can be viewed by tapping on the "BACK BEARING" or "FRONT BEARING" buttons.



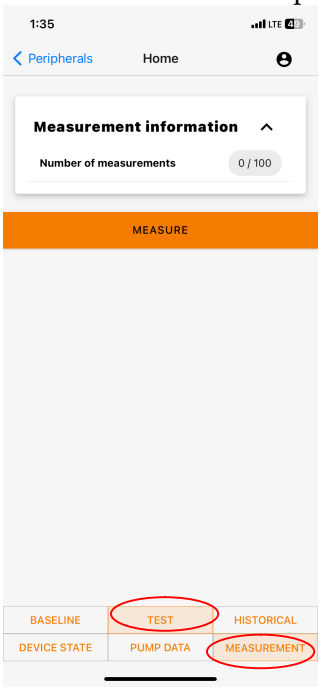
USING THE SYSTEM

1. CONNECTING TO THE READER

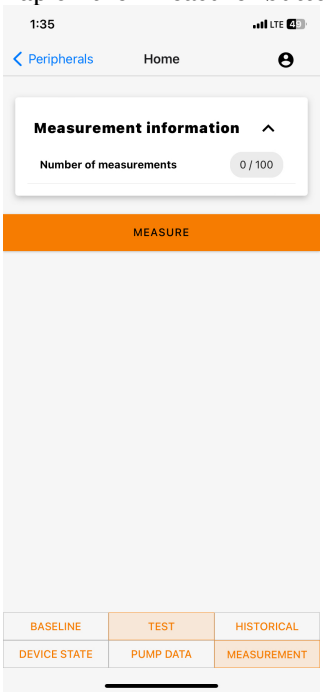
a. Connect to the reader using step 3 of the preceding section "SETTING THE BASELINE". **Note** that you only need to set the baseline **once** during the initial installation of the reader onto the pump.

2. TAKING MEASUREMENTS

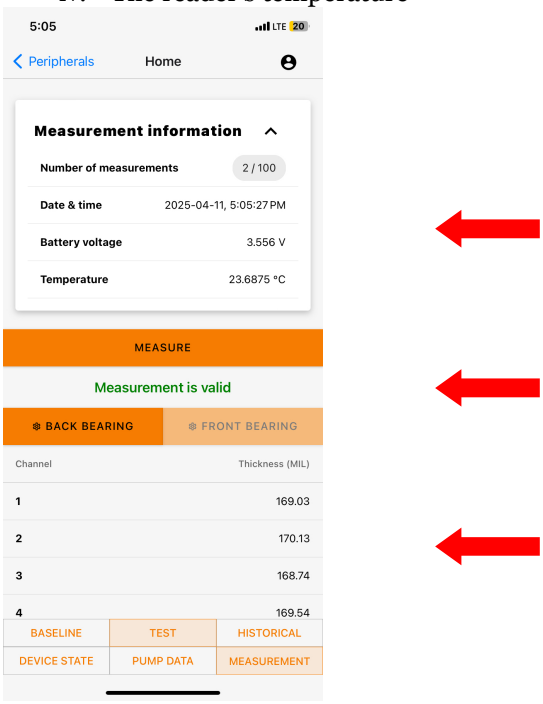
a. Tap on the MEASUREMENT tab at the bottom of the screen. This screen will then display three measurement sub-tabs above the main row of tabs. Tap on the TEST tab.



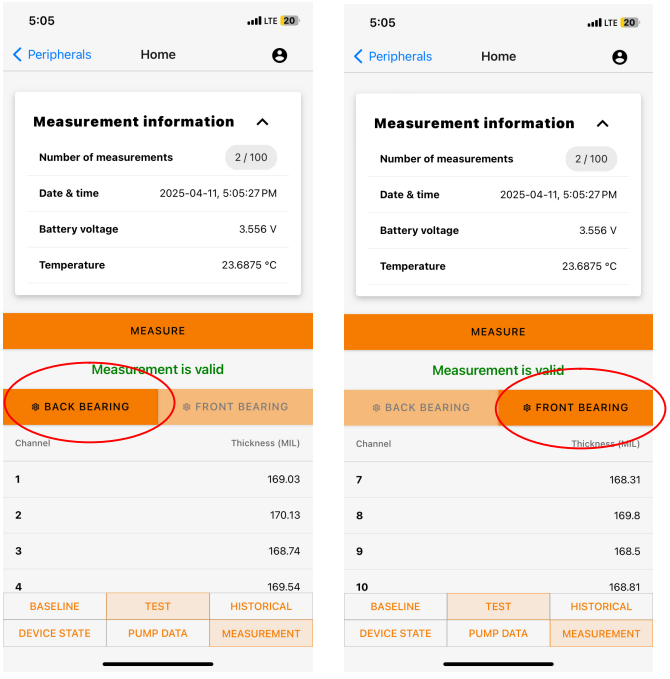
b. Tap on the "Measure" button.



c. The system will then measure all the transducers and display the results. Additionally, the system will record and display:
   i. The total number of measurements on reader. For one reading twice a year, or once a year, this represents 50 to 100 years of data.
   ii. The date and time of the reading.
   iii. The reader's battery voltage.
   iv. The reader's temperature



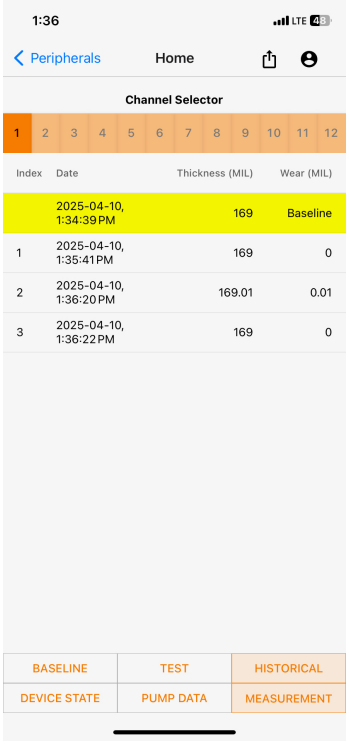
d. You can view readings for each bearing by tapping on the "BACK BEARING" or "FRONT BEARING" buttons.



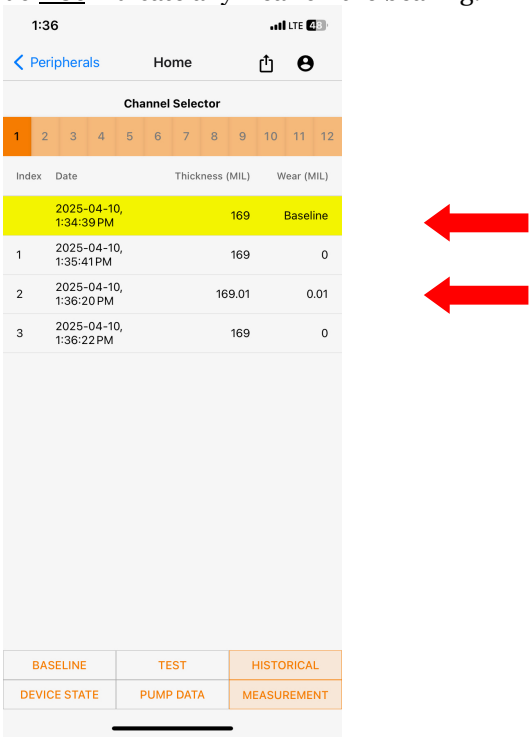
3. VIEW AND EXPORT THE DATA

a. Tap on the MEASUREMENT tab at the bottom of the screen. This screen will then display three measurement sub-tabs above the main tabs. Tap on the HISTORIAL tab. The process of uploading historical data from the reader to the App could take a few moments.

b. When the data is loaded, the data for transducer 1 will be displayed.

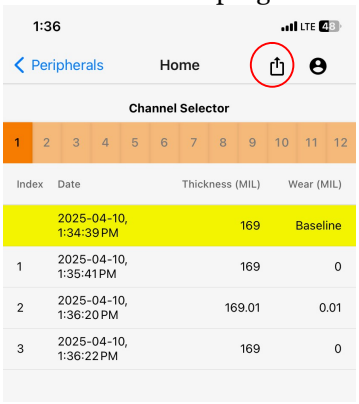


c. The baseline reference will be displayed in a yellow bar, with the subsequent readings (or thickness) displayed below. Each reading will have the date and time it was taken, and its variance to the baseline in mils. This will enable you to quickly scan for any wear trends. Variances within +/- 0.3 mils are within the accuracy range of the system and do **not** indicate any wear on the bearing.

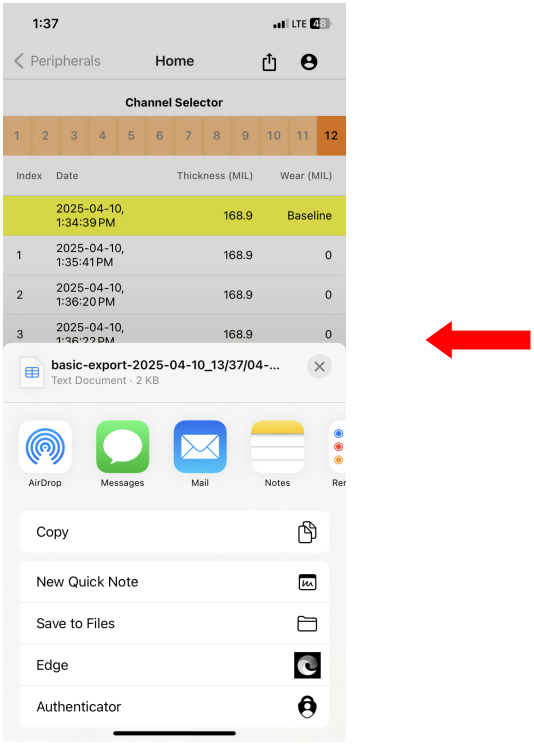


d. Each transducer can be viewed by tapping on its number in the Channel Selector at the top of the screen.

e. To export the data as a *.csv file, tap on the icon in the top right of the screen.



f. Your mobile device's file sharing options will be displayed at the bottom of the screen. You can then email the file or save the file on the mobile device.

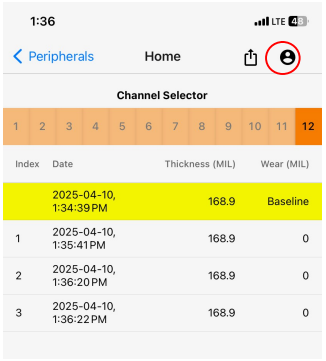


g. The data file will include all the information from the PUMP DATA tab including the pump and reader serial numbers, the baseline, and all historical readings.

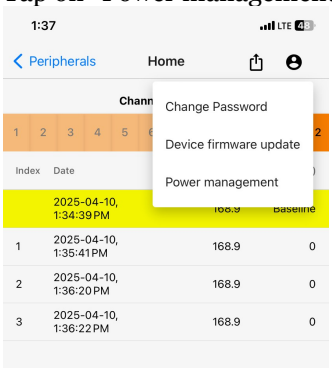
4. POWER DOWN THE READER

a. The reader will power down itself within 3 minutes of inactivity within the App, or when not connected to the App.

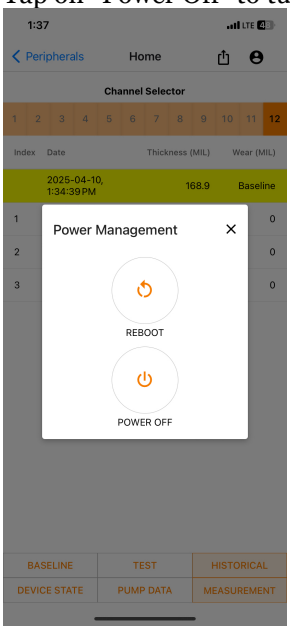
b. The reader can also be shut down manually. Tap on the icon in the top right corner of the screen.



c. Tap on "Power management".



d. Tap on "Power Off" to turn off the reader.



e. Close the App on your mobile device.

Cardinal
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