

**GROUNDWATER
IS OUR
BUSINESS**



PRODUCT MANUAL

Diver-App for Android™



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1 Introduction

1.1 Scope and Purpose

This document is the User Manual of the Diver-App for Android. It is intended to provide all the necessary information to use this software to read and program Diver groundwater data loggers and transfer the collected data to Diver-HUB or an FTP server.

In this chapter an overview of the Diver-App is given including requirements and supported equipment. Chapter 2 contains a brief introduction to start using the Diver-App. Many of the Diver-App features will be touched upon briefly. For a detailed description of each feature see chapters 3 to 6.

1.2 Requirements

To use the features of the Diver-App a Diver-Mate (part no DM421) is required.

Android 10 or higher is required.

The phone must support Bluetooth® Low Energy (BLE).

To use all features of the Diver-App, it must be connected to a Diver-Mate (part no DM421); pairing is not recommended. Make sure the battery of the Diver-Mate is sufficiently charged and it has the latest firmware installed, see the Downloads section on the Diver-Mate page:

vanessen.com/products/accessories/diver-mate.

1.3 Features

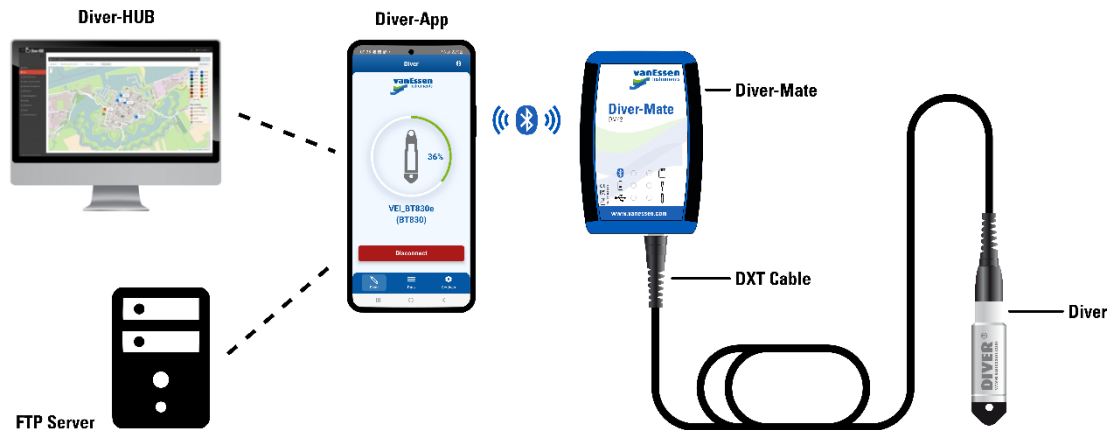
1

The Diver-App features:

- Read Diver settings
- Start and stop your Diver groundwater data logger
- Validate real-time Diver and manual measurement data
- Validate the Diver time and project time
- Download groundwater data from your Diver-Mate and Diver groundwater data logger
- Display downloaded data in a graph
- Share groundwater data via other apps, for example WhatsApp, e-mail
- Transfer groundwater data automatically to the Diver-HUB web portal (or your own FTP server)

1.4 System Overview

A system overview of the Diver-App is depicted in the schematic below. The Diver data flow is from right to left. The Diver is connected to a DXT cable and when the Diver-Mate is connected to the other end of the DXT Cable, the Diver data is automatically download by the Diver-Mate. Once the Diver data is on the Diver-Mate, it can be downloaded by the Diver-App, after which the data can be transferred to Diver-HUB or an FTP server. In addition, project data such as cable lengths can be downloaded from Diver-HUB.



1.5 Interface Layout

Two typical Diver-App interface layouts are shown below. The screen on the left is the HOME screen.

Menu bar: Contains button with access to the features that are available in the Diver-App.

Details frame: A context-sensitive window that changes depending on which menu is selected.

Back button: When a sub-menu is shown in the details frame, the Back button indicated by the ◀ symbol, is shown. Tapping this button will return to the previous screen.

Tabs: In case the details frame contains several features, these features may appear in tabs. The active tab is indicated by a blue line under the Tab name.



1.6 Supported Equipment

The Diver-App supports the following equipment:

- Diver-Mate (DM421)
- TD-Diver and Baro-Diver (DI8xx),
- Mini-Diver and Baro-Diver (DI5xx),
- Micro-Diver (DI6xx),
- Cera-Diver (DI7xx), and
- CTD-Diver (DI27x, DI28x).
- DXT Cables (AS2xxx)
- DDC Cables (AS6xxx via the DDC-DXT adapter (AS348))



2 Getting Started

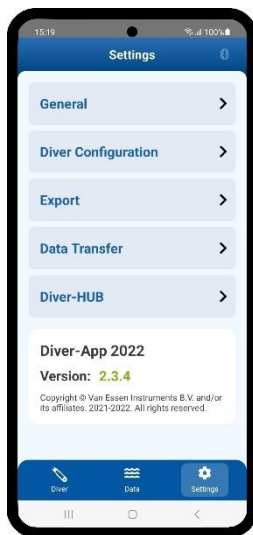
2.1 Installation

To install the Diver-App from the Google Play™ Store on your Android™ device:

1. From the Home screen, navigate: Apps icon > Play Store.
Note: If unavailable, swipe up from the center of the display then tap Play Store.
2. Tap the Google Play search bar (at the top) then enter *Diver-App*.
3. Then tap the Diver-App by Van Essen Instruments to install.
4. To continue, review the required app permissions then tap Accept.

2.2 Configuration

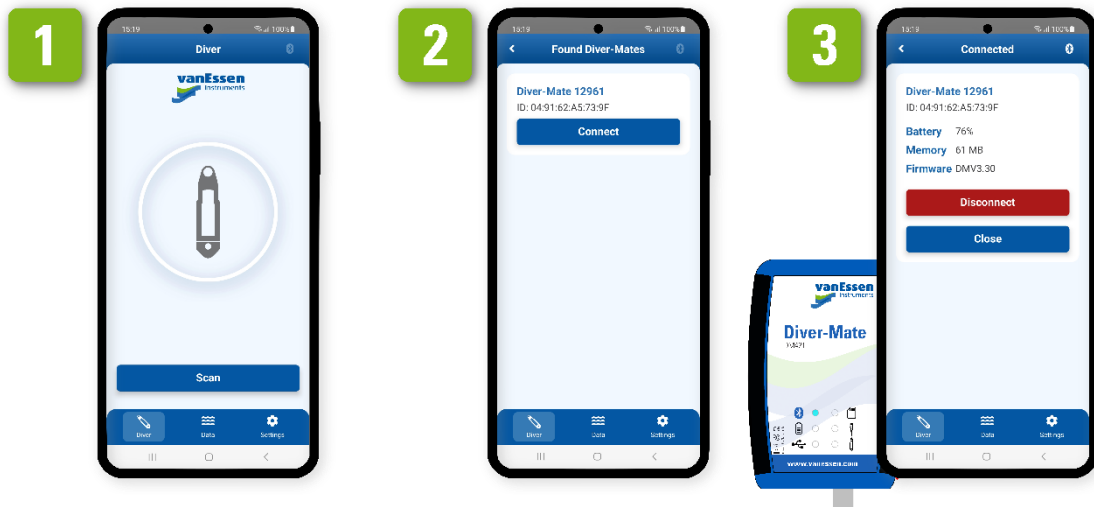
Before starting to use the Diver-App some basic settings can be configured. Tap the Settings button. The screen as shown below appears. Select the desired user interface language, units for pressure/length, temperature, conductivity and project time.



For all available settings see the section [Settings](#) on page 12.

2.3 Connecting to a Diver-Mate

- ❶ Open the Diver-App on your phone and the screen as shown below appears. Tap the Scan button. The Diver-App will start scanning and will list the available Diver-Mates. If the desired Diver-Mate does not appear, then tap Scan in the top-right corner to rescan.
- ❷ When the desired Diver-Mate appears, tap the corresponding Connect button.
- ❸ Next, the Diver-Mate's **battery status, memory used, and firmware version** are shown. Now, a Bluetooth connection is established between your phone and the Diver-Mate. The Bluetooth light on the Diver-Mate is now on. Click OK or the back button ◀ to return to the HOME screen.



2.4 Connecting to a Diver

4 Once a Bluetooth connection with the Diver-Mate has been established, the settings and data of a Diver connected to the Diver-Mate can be read. Connect a Diver via a DXT cable to the Diver-Mate. The three green indicators (memory, cable, Diver) on the Diver-Mate turn on. The Diver-Mate starts to download the data from the Diver to its memory. The download progress is indicated by the green circle.

Note: Downloading data from the Diver to the Diver-Mate is a process independent from the Diver-App, i.e. the Diver-Mate will always download the data when a Diver is connected to it.

5 After the download is complete, the circle around the Diver will turn solid green and the Diver will turn from grey to blue as shown in step 5.

6 Tap the Diver and its settings will be shown. Alternatively, you can disconnect the Diver and proceed with the next Diver knowing that the Diver data is now stored on the Diver-Mate's memory. Note that when you disconnect the Diver from the Diver-Mate the green circle around the Diver disappears.





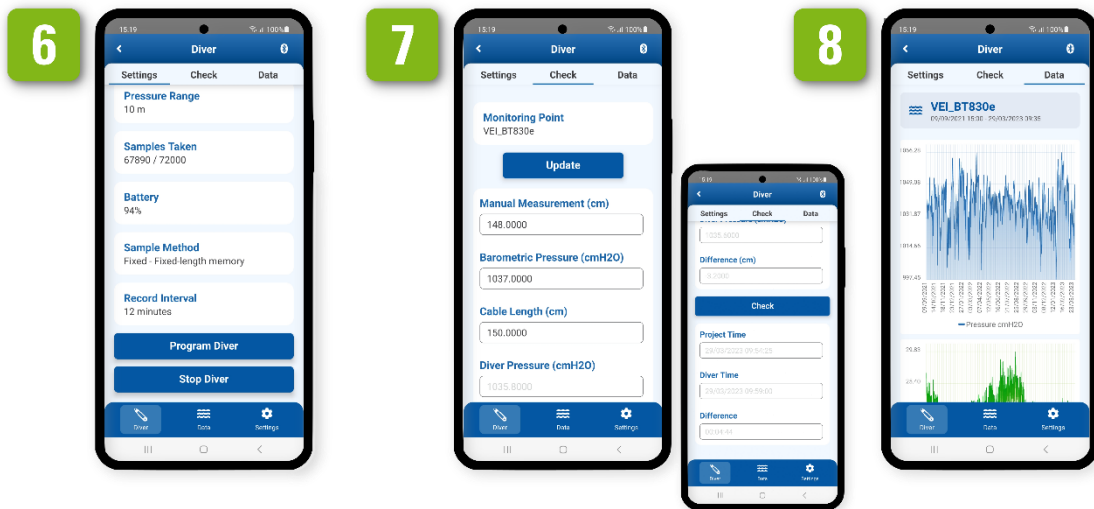
2.5 Diver Settings, Checking, and Viewing Data

6 The settings from the connected Diver are shown, such as monitoring point name, logging status and record interval, etc. See section [Programming and Starting a Diver](#) on page 7 how to change these settings.

7 Tap on the Check tab to validate a manual measurement against the Diver measurements. First enter the value of the manual measurement (top of casing to depth of water) you have taken. The barometric pressure is measured by the Diver-Mate; its value can be changed if needed. Next, enter the cable length on which the Diver is deployed. The Diver Pressure is read only and contains the real-time pressure from the Diver. Scroll down and tap the Check button to calculate the Difference. In addition, also the difference between the project time and Diver time is shown.

Tap the Update button to refresh the Diver and barometric measurements.

8 Tap the Data tab view the data on the Diver. A download progress screen will appear while the data is being transferred from the Diver-Mate to the phone. After the download is completed a graph of the data is shown. In addition, a warning is shown if minimum and/or maximum pressure, temperature and/or conductivity values are detected.



3 Scanning and Connecting

To connect the phone to a Diver-Mate open the Diver-App and the HOME screen as shown below appears. Tap the SCAN button (or the grayed-out Bluetooth icon) to initiate the scanning process. After a Diver-Mate is found it is listed. Tap the CONNECT button to connect to the selected Diver-Mate. After a Bluetooth connection is established the Diver-Mate settings: serial number, Bluetooth Mac address, battery capacity, memory used and firmware version will be shown. Tap OK or ◀ to return to the HOME screen.



Bluetooth

The Bluetooth icon in the top-right corner is now enabled. To view the settings of the connected Diver-Mate tap the Bluetooth icon.

When the phone is connected to the Diver-Mate, it can be disconnected by tapping the Disconnect button or closing the Diver-App.

4 Reading and Programming Divers

Before Divers can be read and programmed, the phone must be connected to a Diver-Mate, a Diver must be connected to the Diver-Mate and all data from the Diver must be downloaded by the Diver-Mate.

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4.1 Diver Settings

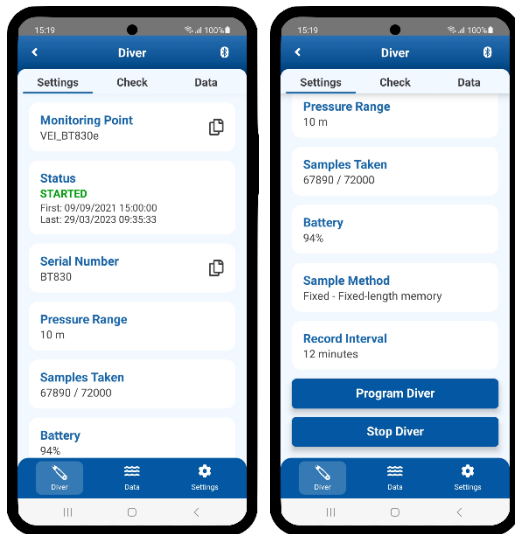
Tap the Diver button in the toolbar to navigate to the HOME screen. Subsequently, tap the Diver icon in the middle of the green circle.

Note: If the circle around the Diver in the HOME screen is not entirely green, then the data download is in progress. Wait until the download finishes.

The Diver Settings tab appears. The settings shown are:

- monitoring point name,
- status (Started, Stopped, or Future Start) including the time stamp of the first and last sample taken,
- serial number,
- pressure range (in the selected unit, see [Units](#) on page 12),
- number of samples taken plus the total memory size,
- battery capacity,
- sample method, and
- record interval.

Scroll down to in this tab to make the Program Diver and Stop Diver button visible (right image below).

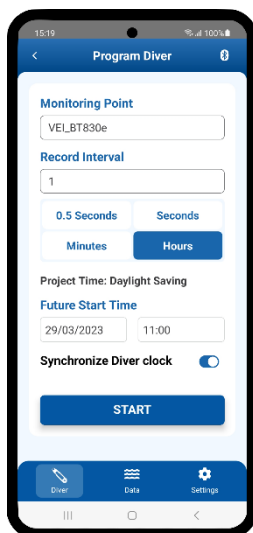


4.2 Programming and Starting a Diver

Tap the Program Diver button in the Settings tab to program and start the connected Diver. The following screen appears. In this screen you must enter the monitoring point name, set the record interval and adjust the date and time the Diver must start logging. The Future Start Time is by default the upcoming next full hour. By default, the Diver clock is synchronized with the project time. Disabling the Synchronize Diver clock option will not synchronize the Diver clock. Finally, tap START to future start the Diver.

See also section [Default Diver Program Settings](#) on page 14 on how to set default values for the Record Interval and the Synchronize Diver clock option. For more details about the project time see section [Time](#) on page 13.

7



Note: After the tapping the START button, the Diver settings are shown in the Settings tab. In case it is suspected that incorrect settings are shown:

1. Tap the back ◀ button.
2. Disconnect and reconnect the Diver.
3. Tap the Diver symbol.



- The correct Diver settings are shown.

4.3 Stopping a Diver

Tap the Stop Diver button in the Settings tab to stop the logging of the Diver. A warning message appears. Confirm to stop the Diver.

Note: See the note in section [Programming and Starting a Diver](#).

4.4 Check

Tap on the Check tab to validate a manual measurement against the Diver measurements and compare the Diver time against the project time.

The barometric and Diver pressure readings are filled out automatically. The barometric pressure is measured by the Diver-Mate, and the value can be modified if needed.

Next, fill out the values for the Manual Measurement and the Cable Length. The cable length value can also be populated automatically from Diver-HUB, see section [Cable Length from Diver-HUB](#) on page 14.

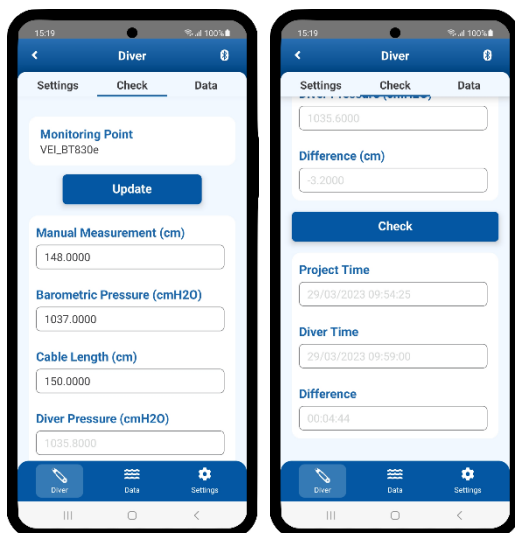
Then, scroll down and tap the Check button, which will calculate the Difference value:

$$\text{Difference} = [\text{Manual Measurement}] - [\text{Cable Length}] + [\text{Diver Pressure}] - [\text{Baro Pressure}]$$

Tap the Update button to refresh the barometric and Diver pressure readings, if needed. This will also recalculate the Difference value.

At the bottom of the Check tab the project and Diver time are shown as well as the difference between the two:

$$\text{Difference} = [\text{Diver Time}] - [\text{Project Time}]$$



4.5 Downloading and Viewing Diver Data

Tap the Data tab to view and download the data from the Diver-Mate (of the connected Diver). First, the communication is initialized indicated by the light green progress bar. Second, the data is downloaded from the Diver-Mate indicated by the dark green progress bar. During this process the



Bluetooth indicator on the Diver-Mate flashes. After the download finishes, the data is shown in multiple graphs.

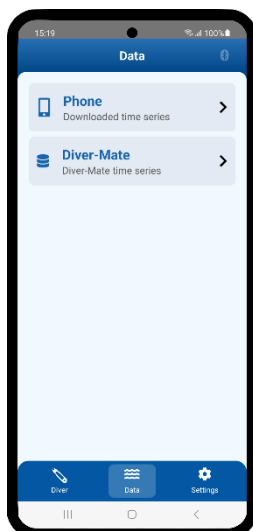


If a minimum or maximum value for pressure, temperature and/or conductivity is detected, then a warning message appears.

5 Data

Tap on the Data button in the menu bar to open the Data screen. In this screen you can manage Diver time series data. The Data screen is shown below. There are two lists of data represented by two tiles:

- Phone – A list of Diver time series that are stored on the phone, and
- Diver-Mate – A list of all the Diver time series that are stored on the Diver-Mate.

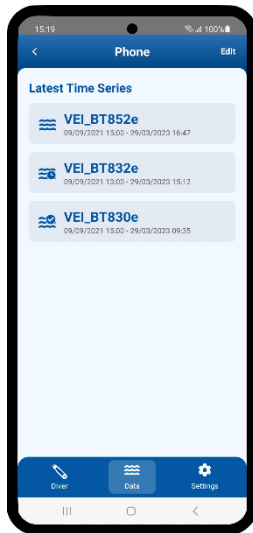







5.1 Phone

Tap on the Phone tile in the Data screen to view a list of the Diver time series that are downloaded from the Diver-Mate and stored on the phone. Each time series is represented by a tile with the monitoring point name and the start and end time.

Tap on a time series tile to view a graph of the data.





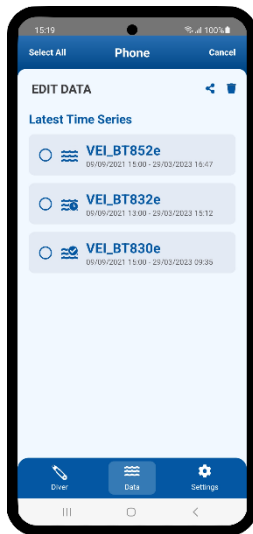
The meaning of the time series icon is as follows:

-  Diver time series on phone.
-  Diver time series on phone ready for upload to Diver-HUB/FTP server.
-  Diver time series on phone and uploaded to Diver-HUB/FTP server

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For more information on transferring data to Diver-HUB or an FTP server see section [Data Transfer](#) on page 15.

Tap on Edit in the top-right corner to share or delete. Then select one or more files and tap the share  or delete  button. You can share MON and/or CSV files with third party apps such as Outlook, WhatsApp, Teams, etc. The type of file(s) shared are defined in the Settings screen, see [File Export](#) section on page 14.





5.2 Diver-Mate

Tap on the Diver-Mate tile in the Data screen to view the 10 most recent Diver time series that are stored on the Diver-Mate.

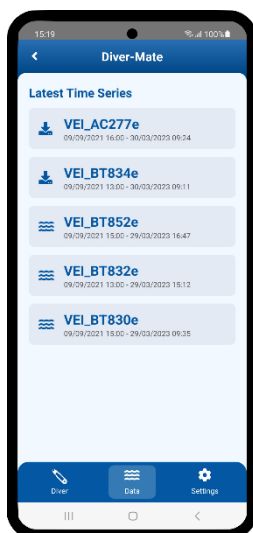
Each time series is represented by a tile with the monitoring point name and the start and end time.

The meaning of the time series icon is as follows:

-  Diver time series on Diver-Mate only. Tap on the tile to download the time series to your phone.
-  Diver time series on Diver-Mate and on phone.

Tap on a time series tile with a download icon to download the time series data from the Diver-Mate to the phone.

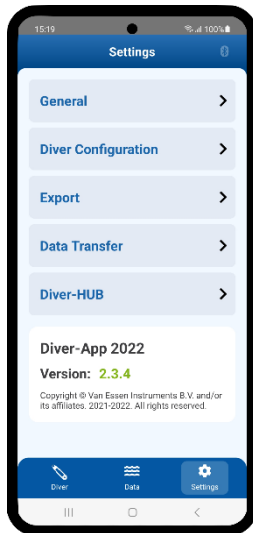
Scroll down and tap the Load More button to view more time series.





6 Settings

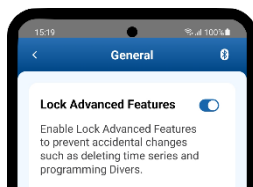
Tap on the Settings button in the menu bar to open the Settings screen. In this screen you can view the version and manage all the Diver-App settings listed below.



6.1 General

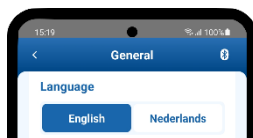
The Lock Advanced Features option allows you to prevent accidental changes that are irreversible such as stopping or programming a Diver. When this option is enabled, the following features are not shown:

- In Diver > Settings: the Program Diver and Stop Diver button are not available.
- In Data > Phone > Edit: the delete option is not available.



6.2 Language

This option allows you to change the Diver-App language. Diver-App supports English and Dutch. Once you select the language, the on-screen language will change instantly.

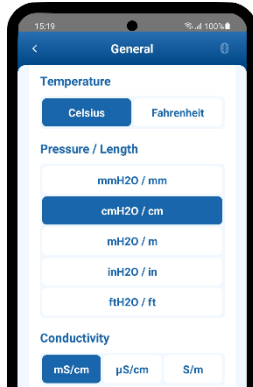


6.3 Units

To change the units, simply tap the desired unit.

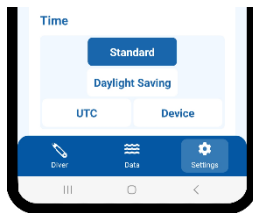


Note: The Length unit is dependent on the Pressure unit. For example, if the pressure unit is mH₂O, the length unit will be meters.



6.4 Time

Tap one of the buttons in the Time section to select the desired project time. The four different options are explained below.



For long term monitoring projects, the time of all the measurements must be aligned to a standard time to ensure that the sampling frequency is consistent when the time changes due to daylight savings time. Specifying the project time in the Diver-App ensures that your Diver is always synchronized with the original Diver time and that no gaps or overlap occur in your data. You can choose from the following options:

- Standard (Wintertime) – The project time will always be synchronized with standard time, e.g., UTC + x, where x depends on the time zones in your region; daylight savings will be ignored.
- Daylight Saving (Summertime) –The project time will always be synchronized with summertime, for example UTC + x – 1, where x depends on the time zone of your region; wintertime will be ignored.
- UTC (Coordinated Universal Time) – The project time will always be synchronized with the Coordinated Universal Time independent of the time zone of your region.
- Device – The project time will always be the same as on your phone.

Most monitoring projects use standard time, ignoring daylight savings time. In some rare cases, long-term monitoring is done using daylight savings time. Either time is acceptable, as long as it is maintained throughout the full duration of the monitoring project.

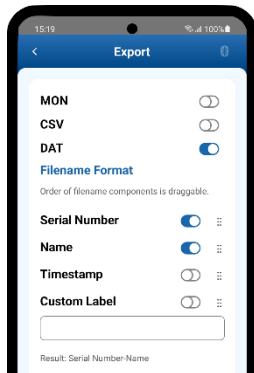
For short-term projects or pumping tests, you will most likely use the computer time, as shifts in time due to daylight savings are irrelevant.



6.5 File Export

When sharing Diver time series data through third party apps such as WhatsApp, MS Teams, etc. the filename format and the file type must be selected in the FILE EXPORT section.

From the Filename Format dropdown list select the desired format. If you select a filename format with a custom label, the Custom Label field enables. Enter your label here and it will appear in the filename of the exported file.



The file types that can be shared are:

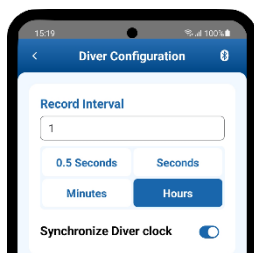
- MON – An ASCII file format supported by Van Essen Instruments' software.
- CSV – Comma Separated Values format, compatible with Microsoft Excel.
- DAT – The Diver file format.

Enable one or both formats for export. Note that for large amounts of data, creating a MON and/or CSV file will take a considerable amount of time.

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6.6 Default Diver Program Settings

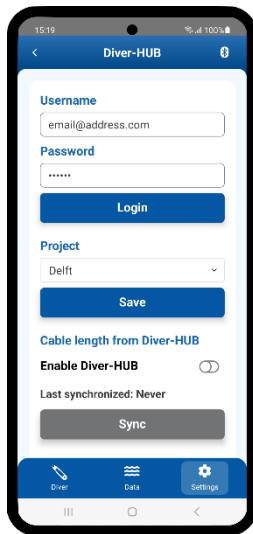
When programming a Diver, see section [Programming and Starting a Diver](#) on page 7, the default or initial value for the record interval and whether the synchronization of the Diver clock is enabled or disabled can be set in the Diver Configuration screen.



6.7 Cable Length from Diver-HUB

When validating a manual measurement against the Diver measurements in the Check tab, see section [Check](#) on page 8, the cable length must be filled out to calculate the difference. To prevent typing errors and the repetitive task for looking up and entering cable lengths values for each monitoring point, the cable lengths can also be retrieved from a specific Diver-HUB project.

In the Settings screen tap the Diver-HUB tile to set or modify the Diver-HUB project. The screen as shown below appears.



Next, type your username, password and tap Login. The dropdown list will now populate with the projects for your account. Select the project you want to get the cable lengths from, and tap Save. Finally, enable the Enable Diver-HUB option to automatically fill out the cable length in the Check tab of the Diver screen. Disable this option if you no longer want the cable length to be filled out automatically.

In case changes were made to the cable lengths in Diver-HUB, you can download the most recent values by tapping the Sync button.

6.8 Data Transfer

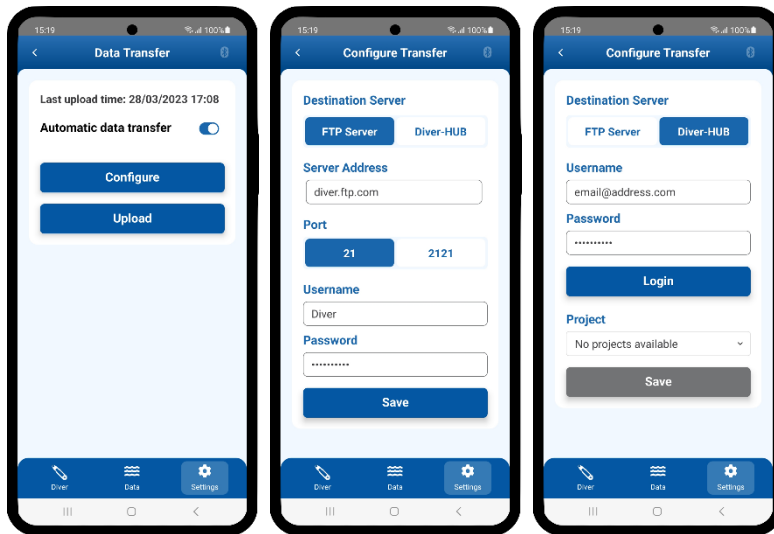
15

The Diver-App allows you to send collected Diver time series data (DAT files) from your phone to Diver-HUB or an FTP server of your choice. The FTP server must be FTP or FTPS and port 21 or 2121 must be open. SFTP is not supported.

6.8.1 Setup

To setup the data transfer, tap the Data Transfer tile in the Settings screen, see the left image below.

Tap the Configure button to setup the data destination. A new screen will appear, where you first select where you want to upload the data to by selecting *FTP Server* or *Diver-HUB* in the Destination Server section.



- Configuring Diver-HUB – If you select *Diver-HUB* as the data destination, then enter your username and password of your Diver-HUB account. Next tap Login and the Project dropdown list will be populated with the available projects. Select the project you want to send the Diver time series data to, then tap Save.
- Configuring an FTP Server – If you select *FTP Server* as the data destination, then enter the FTP server address (this can also be an IP address), select the port number (21 or 2121), the FTP server credentials (provided by your system administrator) and tap Save.

A message appears: if the connection was successful, tap Close and tap the back ◀ button. In case the connection was unsuccessful, check your settings, credentials, and internet connection.

6.8.2 Time Series Data

Diver time series data is only marked *ready for upload* when the time series is downloaded from the Diver-Mate to the phone and a data destination has been properly configured.

This means that if the data destination has not been configured and time series data is downloaded from the Diver-Mate to the phone, these time series will not be marked *ready for upload* and never be uploaded to Diver-HUB or the FTP server even when the data destination is configured afterwards.

In case a Diver time series was not sent at all or not sent to the preferred data destination, then first delete the time series from the phone. Second, setup the preferred data destination and third, download the Diver time series from the Diver-Mate.

6.8.3 Uploading Data

After the data destination (Diver-HUB or FTP server) is configured, you can either select automatic or manual upload. The Automatic data transfer option can only be enabled if a valid data destination is set. If the Automatic data transfer option is enabled, then there are 3 triggers when the Diver-App sends the data:

- The Diver-App is opened,
- The list of time series on the phone (Data ▶ Phone) is viewed, and
- After a graph of the data from the connected Diver was shown and you navigate away from the graph, for example back to the HOME screen.

Alternatively, you may upload the time series manually by tapping the Upload button.



If no connection can be made to Diver-HUB or the FTP server at the time one of the three triggers is fired or the Upload button is tapped, then the status of the Diver time series will remain *ready for upload* and the Diver-App attempts to upload the time series again the next time a trigger is fired.