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HERON
INSTRUMENTS INC.

dipperLog+ Series *User/Software Manual*



www.heroninstruments.com

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dipperLog 128+ Technical Specifications



dipperLog 128+ Technical Specifications

Performance	# of Data Sets	128,000
	Download Speed	21,333.33 Data Sets/min (128,000 readings/downloads in 6 minutes)
	Water Level Accuracy (Typical)	+/- 0.05%FS (0 °C to 50 °C)
	Temperature Accuracy (Typical)	+/- 0.05 °C Temperature Sensor Meets ASTM E1112 and ISO 80601-2-56. NIST Traceability.
Operating Features	Pressure Ranges	10m/30ft (14PSI), 30m/100ft (43PSI), 60m/200ft (85PSI), 120m/400ft (171PSI)
	Overpressure Rating	2X Factory Calibrated Range
	Operating Temperature	-20 °C to 80 °C (-5 °F to 175 °F)
	Pressure Resolution %FS	0.001
	Battery Life (Depending On Usage)	Up to 5,000,000 Readings Up to 15 Years
	Warranty	3 Years
Physical Characteristics	Wetted Material	316 SS, Delrin®, Buna-N
	O-Ring (Primary)	Buna-N
	O-Ring (Backup)	Viton
	Transducer	316 SS Piezoresistive Silicon
	Length	145mm / 5.7"
	Diameter	22mm / 0.87"
	Weight	170g
	Deployment Options	Suspended, Direct Read, Reel

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dipperLog Tough+ Technical Specifications



dipperLog Tough+ Technical Specifications

Performance	# of Data Sets	128,000
	Download Speed	21,333.33 Data Sets/min (128,000 readings downloads in 6 minutes)
	Water Level Accuracy (Typical)	+/- 0.05%FS (0 °C to 50 °C)
	Temperature Accuracy (Typical)	+/- 0.05 °C Temperature Sensor Meets ASTM E1112 and ISO 80601-2-56. NIST Traceability.
Operating Features	Pressure Ranges	10m/30ft (14PSI), 30m/100ft (43PSI), 60m/200ft (85PSI), 120m/400ft (171PSI)
	Overpressure Rating	2X Factory Calibrated Range
	Operating Temperature	-20 °C to 80 °C (-5 °F to 175 °F)
	Pressure Resolution %FS	0.001
	Battery Life (Depending On Usage)	Up to 5,000,000 Readings Up to 15 Years
	Warranty	3 Years
Physical Characteristics	Wetted Material	Titanium, Delrin®, Teflon™
	O-Ring (Primary)	Teflon™
	O-Ring (Backup)	Viton
	Transducer	Titanium Piezoresistive Silicon
	Length	145mm / 5.7"
	Diameter	22mm / 0.87"
	Weight	150g
	Deployment Options	Suspended, Direct Read, Reel

dipperLog Vented+ Technical Specifications



dipperLog Vented+ Technical Specifications

Performance	# of Data Sets	128,000
	Download Speed	21,333.33 Data Sets/min (128,000 readings/downloads in 6 minutes)
	Water Level Accuracy (Typical)	+/- 0.05%FS (0 °C to 50 °C)
	Temperature Accuracy (Typical)	+/- 0.05 °C Temperature Sensor Meets ASTM E1112 and ISO 80601-2-56. NIST Traceability.
Operating Features	Pressure Ranges	10m/30ft (14PSI), 30m/100ft (43PSI), 60m/200ft (85PSI), 120m/400ft (171PSI)
	Overpressure Rating	2X Factory Calibrated Range
	Operating Temperature	-20 °C to 80 °C (-5 °F to 175 °F)
	Pressure Resolution %FS	0.001
	Battery Life (Depending On Usage)	Up to 5,000,000 Readings Up to 15 Years
	Warranty	3 Years
Physical Characteristics	Wetted Material	316 SS, Delrin®, Buna-N
	O-Ring (Primary)	Buna-N
	O-Ring (Backup)	Viton
	Transducer	316 SS Piezoresistive Silicon
	Length	145mm / 5.7"
	Diameter	22mm / 0.87"
	Weight	170g
	Deployment Options	Direct Read

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dipperLog 64+ Technical Specifications



dipperLog 64+ Technical Specifications

Performance	# of Data Sets	64,000
	Download Speed	21,333.33 Data Sets/min (64,000 readings downloads in 3 minutes)
	Water Level Accuracy (Typical)	+/- 0.05%FS (0°C to 50°C)
	Temperature Accuracy (Typical)	+/- 0.5°C
Operating Features	Pressure Ranges	10m/30ft (14PSI), 30m/100ft (43PSI), 60m/200ft (85PSI), 120m/400ft (171PSI)
	Overpressure Rating	2X Factory Calibrated Range
	Operating Temperature	-20°C to 80°C (-5°F to 175°F)
	Pressure Resolution %FS	0.001
	Battery Life (Depending On Usage)	Up to 3,750,000 Readings Up to 10 Years
	Warranty	2 Years
Physical Characteristics	Wetted Material	316 SS, Delrin®, Buna-N
	O-Ring (Primary)	Buna-N
	O-Ring (Backup)	Viton
	Transducer	316 SS Piezoresistive Silicon
	Length	145mm / 5.7"
	Diameter	22mm / 0.87"
	Weight	170g
	Deployment Options	Suspended, Direct Read, Reel

dipperLog 32+ Technical Specifications



dipperLog 32+ Technical Specifications

Performance	# of Data Sets	32,000
	Download Speed	21,333.33 Data Sets/min (32,000 readings downloads in 1.5 minutes)
	Water Level Accuracy (Typical)	+/- 0.1%FS (0°C to 40°C)
	Temperature Accuracy (Typical)	+/- 0.5°C
Operating Features	Pressure Ranges	30m/100ft (43PSI)
	Overpressure Rating	2X Factory Calibrated Range
	Operating Temperature	-20°C to 80°C (-5°F to 175°F)
	Pressure Resolution %FS	0.01
	Battery Life (Depending On Usage)	Up to 2,500,000 Readings Up to 5 Years
	Warranty	1 Year
Physical Characteristics	Wetted Material	316 SS, Delrin®, Buna-N
	O-Ring (Primary)	Buna-N
	O-Ring (Backup)	Viton
	Transducer	316 SS Piezoresistive Silicon
	Length	145mm / 5.7"
	Diameter	22mm / 0.87"
	Weight	170g
	Deployment Options	Suspended, Direct Read, Reel

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barLog Technical Specifications



barLog Technical Specifications		
Performance	# of Data Sets	128,000
	Download Speed	21,333.33 Data Sets/min (128,000 readings downloads in 6 minutes)
	Pressure Accuracy (Typical)	+/- 0.05%FS (0 °C to 50 °C)
	Temperature Accuracy (Typical)	+/- 0.05 °C Temperature Sensor Meets ASTM E1112 and ISO 80601-2-56. NIST Traceability.
Operating Features	Pressure Ranges	N/A
	Overpressure Rating	2X Factory Calibrated Range
	Operating Temperature	-20 °C to 80 °C (-5 °F to 175 °F)
	Pressure Resolution %FS	0.001
	Battery Life (Depending On Usage)	Up to 5,000,000 Readings Up to 15 Years
	Warranty	3 Years
Physical Characteristics	Wetted Material	N/A
	O-Ring (Primary)	Buna-N
	O-Ring (Backup)	Viton
	Transducer	316 SS Piezoresistive Silicon
	Length	145mm / 5.7"
	Diameter	22mm / 0.87"
	Weight	170g
Deployment Options	N/A	

About Pressure/Level Sensors

Pressure transducers measure changes in pressure (m/ft) caused by water or other fluids on an internal media-isolated strain gauge. Heron offers dipperLogs with either absolute (non-vented) or gauged (vented) pressure sensors.

Absolute Pressure Sensor

Absolute/non-vented pressure transducers measure pressure sensed by the strain gauge, **including atmospheric pressure**. All absolute loggers measure in meters or feet, with respect to zero pressure. The back of an absolute pressure sensor is sealed off from the atmosphere, which causes the front of an absolute pressure sensor to respond to both atmospheric pressure **and** the pressure of the head of water above the sensor. (**REQUIRES BAROMETRIC COMPENSATION USING barLog**)

Gauged Pressure Sensor

A gauged or vented pressure sensor eliminates the effects of atmospheric pressure because the vent tube in the vented cable allows atmospheric pressure to be applied to the back of the sensor. The units of measure are meters or feet, with respect to atmospheric pressure.

Barometric Atmospheric Pressure Sensor

Barometric loggers sense changes in barometric pressure within a particular area. The data these loggers collect, can be used to compensate for barometric changes when monitoring water levels. This is important because barometric pressure can fluctuate from one monitoring location to another because of topographical/meteorological changes in the environment.

System Components

Instrument

The dipperLog is completely sealed and contains no user-serviceable parts. The dipperLog has pressure and temperature sensors, a real-time clock, flux capacitor, microprocessor, sealed lithium battery and non-volatile memory. Choose between non-vented (absolute) or vented (gauged) pressure sensor in various pressure ranges.



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Vented/Non-Vented Direct Read Cable



Vented Direct Read Cable

Vented cable is used with the dipperLog Vented+ to record gauged measurements. The cable vent tube allows atmospheric pressure to be applied directly to the back of the sensor. There is no need for barometric compensation using vented cable.



Non-Vented Direct Read Cable

Non-vented cable is used with the dipperLog Tough+, 128+, 64+ and 32+ models to record absolute measurements. To compensate your absolute measurements, use your barLog files within the dipperLog Software.

Note: Both styles of direct read cable allow communication while the logger is in the well.

Customizable Cable Length

Standard Non-Vented Cable Lengths:

(2m/5ft), (5m/15ft), (10m/30ft), (15m/50ft), (30m/100ft), (45m/150ft), (60m/200ft), (75m/250ft), (100m/300ft), (150m/500ft), (225m/750ft), (300m/1000ft)



Polyethylene Suspension Cord

High tensile polyethylene suspension cord can be used to install non-vented data loggers, or barometric loggers. Use the suspension cord as a part of the Suspended Absolute Model of dipperLogs (no communication while in-situ). Available in two lengths: 75m/250ft or 300m/1000ft.

Note: Can be easily cut to desired length



Communication Cable

The Heron **P.C. Communication Cable** (PN# 5009) offers an interface between the dipperLog/barLog and the user's computer/tablet. The Heron P.C. Communication cable is used when programming/downloading data from a logger.

(Length: 1m/3ft)

(Connections: USB Type A / 3.5mm Jack)



Lockable Well Cap/Plug

The Lockable Well Plug and Cap are designed to prevent anyone or anything that is unwanted from entering or putting things into the well. The Well Plug (PN# 5006) is to be used with the **suspended absolute model**. The Well Cap (PN# 5007) is used with the **direct read absolute model**.



dipperLog Software USB

The dipperLog Software (PN# 5008) comes free with every dipperLog purchased. The latest version of the dipperLog Software can be downloaded from www.heroninstruments.com

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Accessories



dipperLog Maintenance Kit

To help get the most out of your Heron dipperLog, purchase the dipperLog Maintenance Kit (PN# 5024) to keep your dipperLogs accurate and performing at their peak for many years. The maintenance kit consists of:

1. 5x packs of Alconox® Powdered Precision Cleaner
2. 25x Replacement O-Rings
3. O-Ring Applicator Guide & Pick
4. Cleaning Cloth
5. Rubber Gloves



Accessory Case

The Heron Accessory Case (PN# 2054) comes with soft padding on the inside to protect your equipment/ accessories.

Approximately: Width: 30cm (12")
 Length: 30cm (12")
 Height: 8cm (3")



tapNtell

The tapNtell (PN# 5020) is a surface mount weather resistant display accessory for the dipperLog well head readout version. The connector end of the tapNtell is attached to the direct read well head and the surface mount display unit can be attached to the side of the casing, fence or pump house (any solid surface). The tapNtell provides an instant real time reading of water level and temperature with a tap of a finger.

SDI-12

The SDI-12 (PN# 5021) system enables the dipperLog data to be accessed from remote locations by a central computer base without site visits. The sensors can be interchanged without reprogramming the data recorder with calibration or other information. The power is supplied to the sensors through a third party device that enables telemetric data readings.

Operating Voltage (DC) :: 7.5 – 35 VDC

Supply Current (Stand-by) :: 10µA

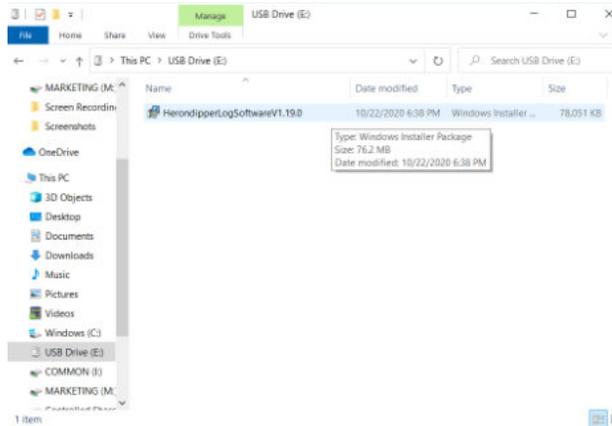
Supply Current (Active) :: 1.5mA



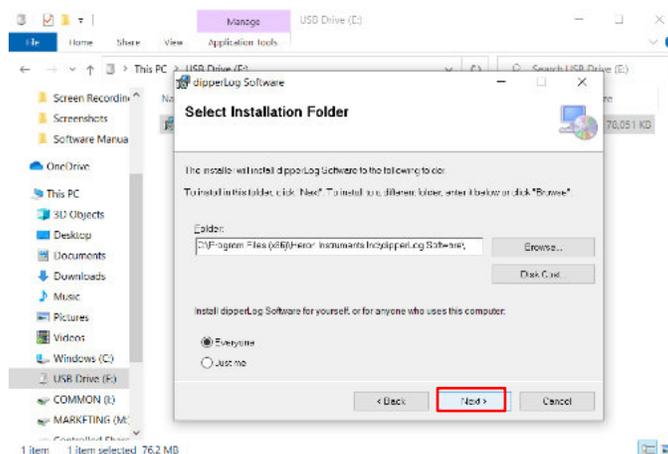
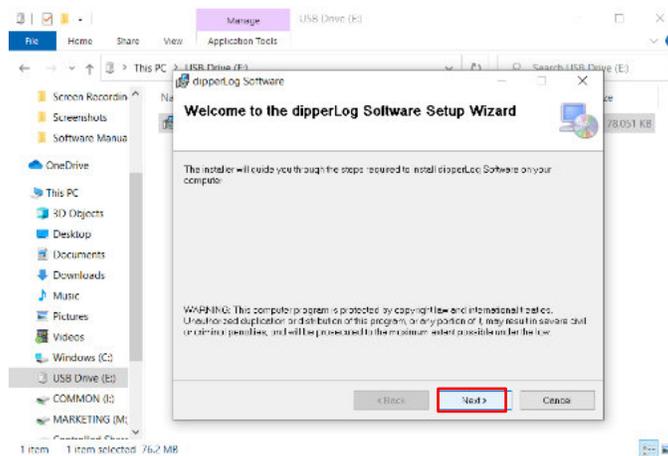
Getting Started

Downloading dipperLog Software

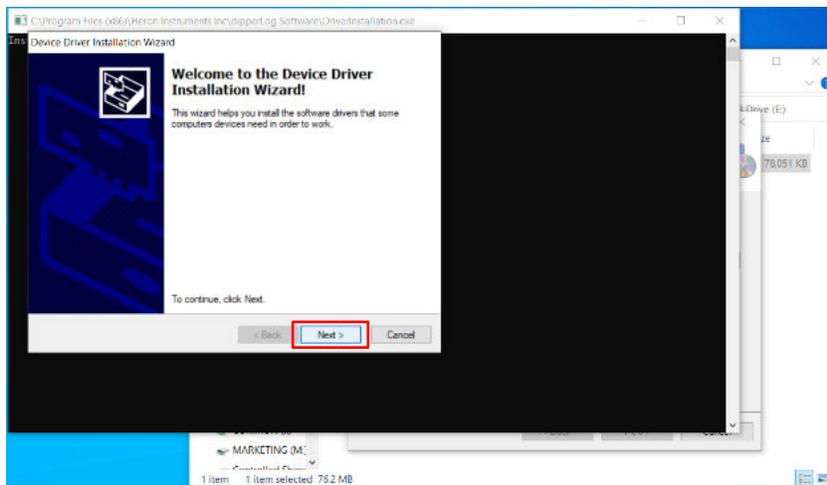
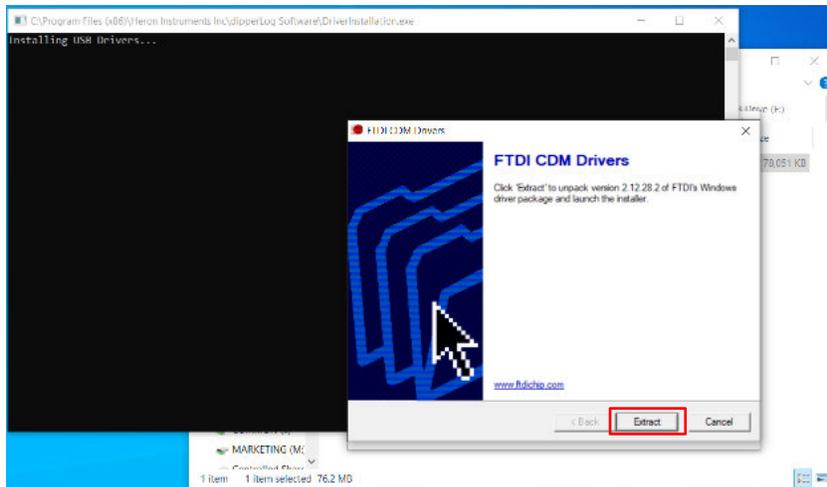
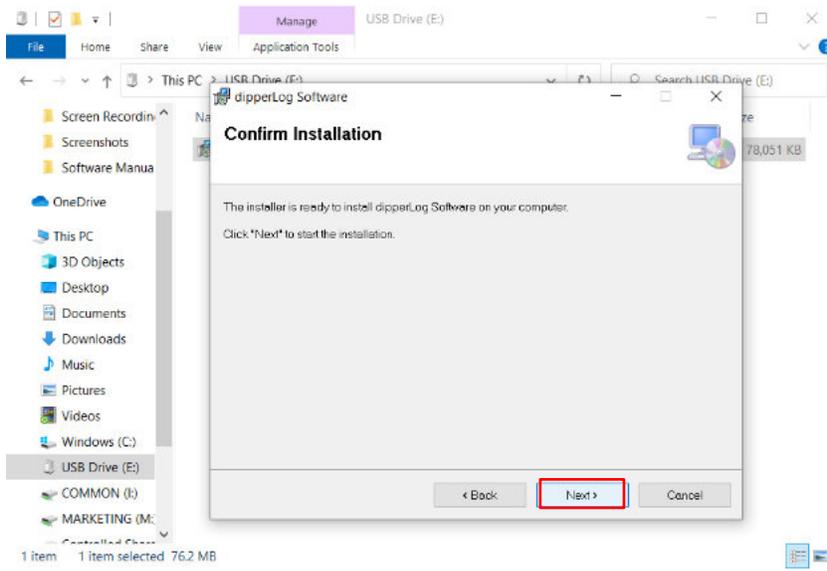
1. Insert provided Heron USB.
(dipperLog Software can also be obtained from www.heroninstruments.com)
2. Open USB Drive, find dipperLog Software download file.



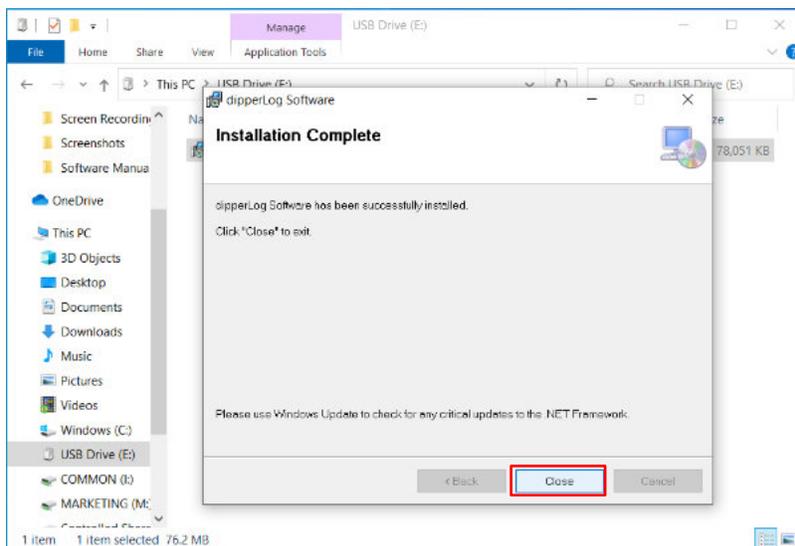
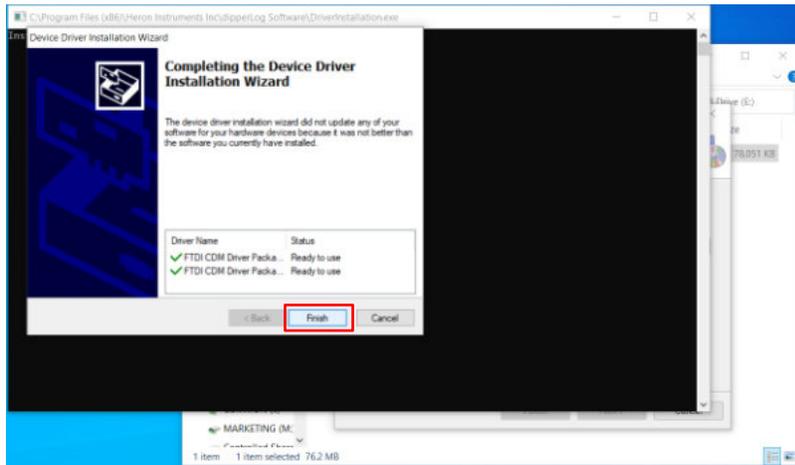
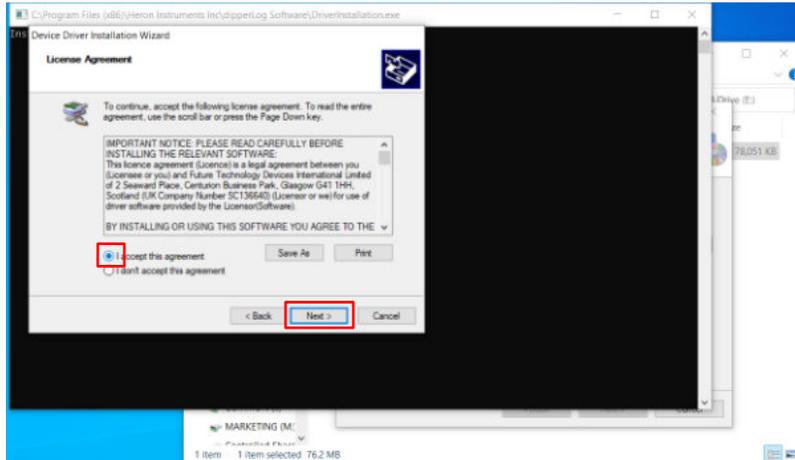
3. Follow the steps of the setup wizard.



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Downloading dipperLog Software - Continued



4. The dipperLog Software is now successfully downloaded.

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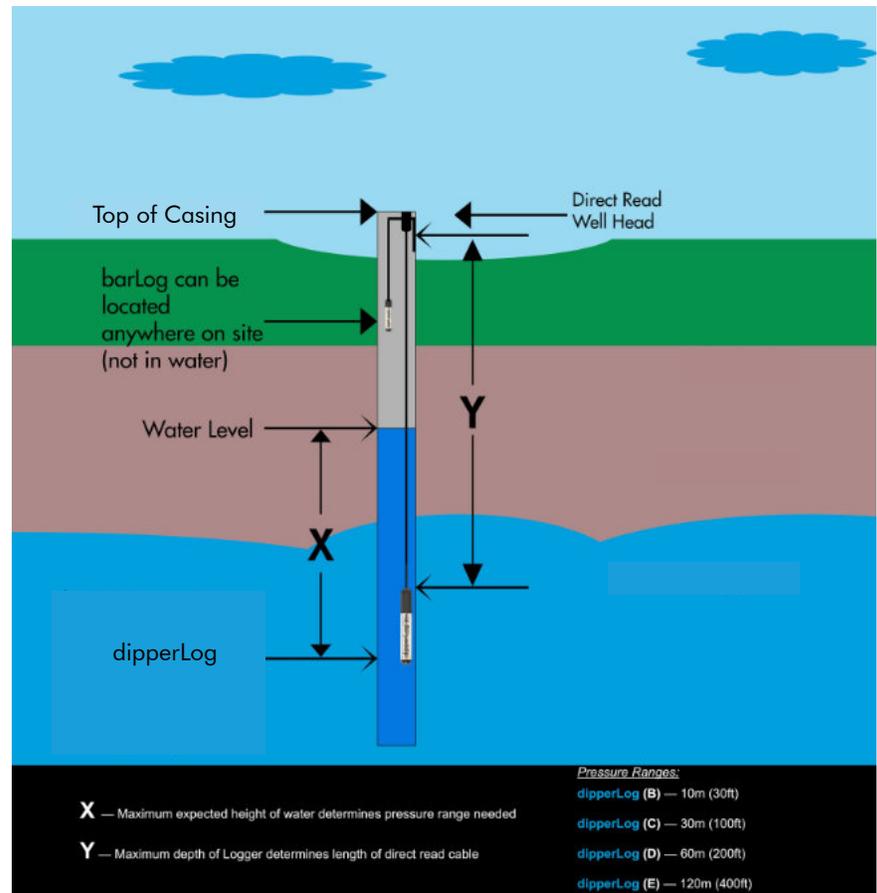
Field Deployment

Program the dipperLog

In order to setup or download data from a dipperLog, you must connect to a computer with the latest dipperLog Software installed.

Position the Instrument

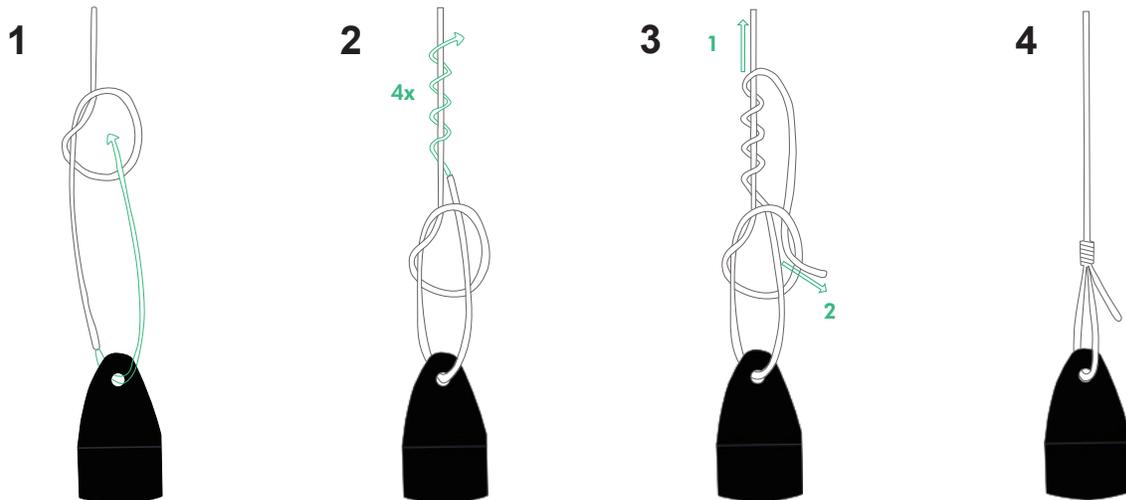
Place the dipperLog at the desired depth. Deploy the dipperLog below the lowest anticipated water level, but not so low that the pressure sensor range might be exceeded at the highest anticipated water level. Refer to the diagram below to determine usable depth.



Verify Depth

After the dipperLog on direct read or vented cable has been installed, you can connect the logger to the dipperLog Software and take a realtime reading to verify that the dipperLog has been deployed where you want. Once you have successfully verified the deployment position, you can fasten your deployment cord/cable. To verify your deployment depth, use a Heron dipper-T water level meter.

Secure the Cord (Suggested Knot Below)



Installation Guidelines

Follow these suggestions for a successful deployment:

- Carefully lower the logger wherever deploying (although robust, free-falling could cause damage to the sensor).
- Once your dipperLog is installed, verify the water level measurement.
 - You can do this using a dipper-T water level meter or dipper-See inspection camera.
- For the best accuracy, ensure your dipperLog is stationary while recording data.
- Deploy barLog's at least 2m/6ft below ground level to avoid frost in chillier climates (but make sure it is still above the high water line).
- Do not deploy your dipperLog where there is a chance ice will form, this can damage the sensor.

Note: Do not allow vented cable to bend enough to obstruct the internal vent tube.
(Minimum Bend Radius $\approx 5\text{cm}/2''$)

Stabilization Time

Following installation of a logger, allow for about 10 minutes (in ideal cases) before taking data reading in order for the logger to stabilize. Also, the deployment cable has a tendency to stretch and relax, which could cause changes in your readings (especially during long-term deployments). The cable stretch is what causes the stabilization to occur. The pressure sensor should respond instantaneously. The cable relaxes and is the cause of the stabilization period.

barLog Installation

The barLog is designed to log barometric pressure at surface level within range of an absolute dipperLog. barLog data can then be used to compensate for barometric pressure changes. Deploy barLog's at least 2m/6ft below ground level to avoid frost in chillier climates (but make sure it is still above the high water line).

Programming the barLog

In order to setup or download data from a barLog, you must connect to a computer with the latest dipperLog Software installed.

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dipperLog Software Overview

About dipperLog Software

The dipperLog Software is Heron's free dipperLog control application for any of your Heron Instruments data loggers. Available for all Windows operated computers/tablets, you can take the dipperLog Software to any job site. Tested to run on Windows 10 x86 laptops, desktops and tablets. Will run on Windows 8, 7, Vista and XP. The dipperLog Software allows users to deploy dipperLogs, view real-time readings, adjust a deployment, record & compensate data and export data in either .txt or .csv format.

Device Setup

The device setup tab is used only when setting up a new logger.

Note: if you have a logger already on a mission, this tab will be inaccessible. When you plug in a new logger, or one that is not on a mission, the device setup tab will open automatically.

To start a new deployment, fill out the provided form to set up the logger.

Job Number: 5 Digits (Numbers/Letters) to Represent Job Site.

Well Number: 5 Digits (Numbers/Letters) to Represent Particular Well.

Take Reading After: Refers to the frequency of readings (Seconds, Minutes, Hours, Log Time).

Transducer Depth: The depth/distance the logger will be from the reference point (Ground level, Top of casing etc.). You can press the "Realtime" button to use the current depth if deploying while the logger is down the well (Direct Read Models).

Delayed Start: Check the box and select the time and date you would like to start the recording (optional).

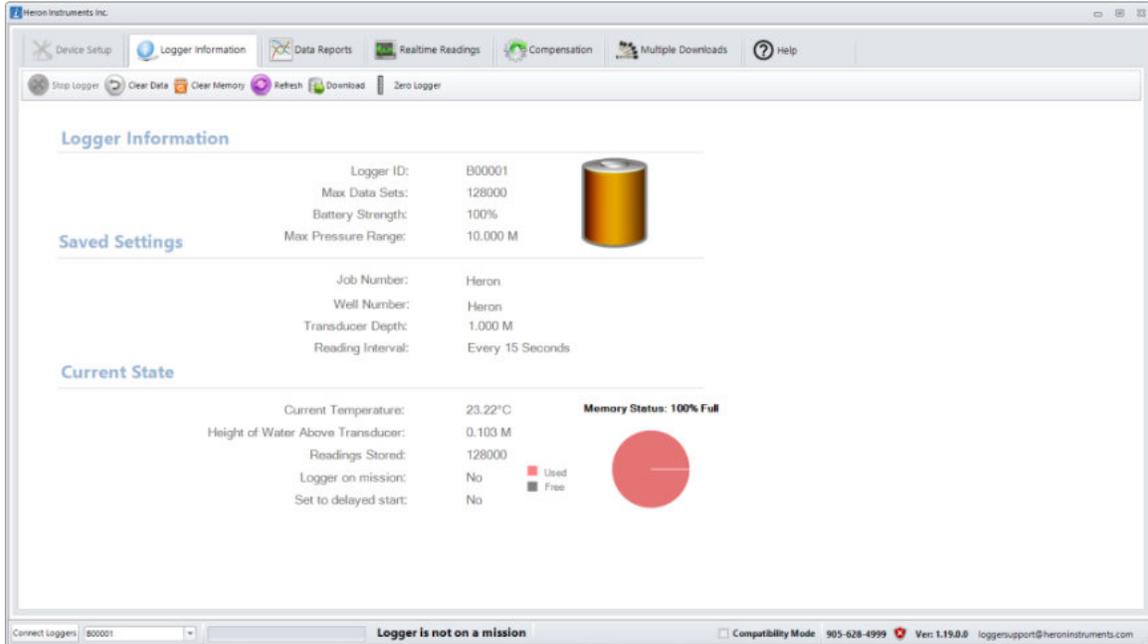
Set Logger Date and Time: This field allows you to set your logger to a different time or time zone than your computer (i.e. Daylight Savings vs Standard).

Reset Form: Will clear all fields of the form.

Save & Start: Once all of the information is filled in, click "Save & Start" to begin the logger's mission.

Logger Information

When you open the dipperLog Software, it opens to the “Logger Information Tab”. With a logger connected via the P.C. Communication Cable, press the connect loggers button in the bottom left hand corner. **Note:** If the logger was on a mission, the empty fields will become populated with data. If it is a new logger, the device setup tab will automatically open.



Logger Information

Logger ID: Serial Number of Logger

Max Data Sets: Maximum Capacity of Data Sets for that Logger

Battery Strength: Loggers Battery % Remaining

Max Pressure Range: Maximum Pressure Range (in either Meters or Feet depending on your computer's settings)

Logger Information

Logger ID:	B00001
Max Data Sets:	128000
Battery Strength:	100%
Max Pressure Range:	10.000 M



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Saved Settings

Job Number: 5 Digits (Numbers/Letters) to Represent Job Site

Well Number: 5 Digits (Numbers/Letters) to Represent Particular Well

Transducer Depth: The depth/distance the logger will be from the reference point (Ground level, Top of casing etc.)

Reading Interval: Refers to the frequency of readings (Seconds, Minutes, Hours, Log Time)

Saved Settings

Job Number:	Heron
Well Number:	Heron
Transducer Depth:	1.000 M
Reading Interval:	Every 15 Seconds

Current State

Current Temperature: The temperature of the logger when it was connected in either °C or °F

Height of Water Above Transducer: The height of water above the transducer when it was connected in either Meters or Feet depending on your computer's settings.

Readings Stored: Indicates how many readings are currently stored on the logger

Logger on mission: Indicates if the logger is on a mission or not

Set to delayed start: Indicates if the logger is set to start immediately or on a delayed start

Logger started on... Indicates the date when the logger was started (only if the logger is currently on a mission)

Memory Status: shows your logger's available memory in both a percentage and pie chart format. Red = Used. Black = Free.

Current State

Current Temperature:	23.22°C	Memory Status: 100% Full 
Height of Water Above Transducer:	0.103 M	
Readings Stored:	128000	
Logger on mission:	No	
Set to delayed start:	No	

Logger Information - Secondary Tabs

Stop Logger: Stop logger will cause the logger to stop taking recordings. All of your data will remain in the logger's memory. Note: you cannot restart a mission once stopped.

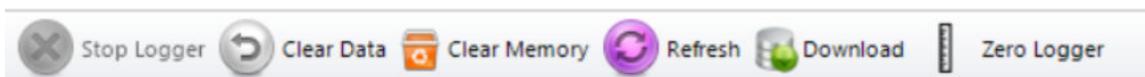
Clear Data: Clear Data will erase only the recorded data from the logger, while leaving the device's settings the same.

Clear Memory: Clear memory of all the recorded data from the logger, as well as the logger's settings.

Refresh: Refresh causes the information displayed on the Logger Information page to refresh as if being connected again.

Download: Download causes the information being stored in the logger's memory to be transferred into the dipperLog Software (this will cause the "Data Reports" tab to open).

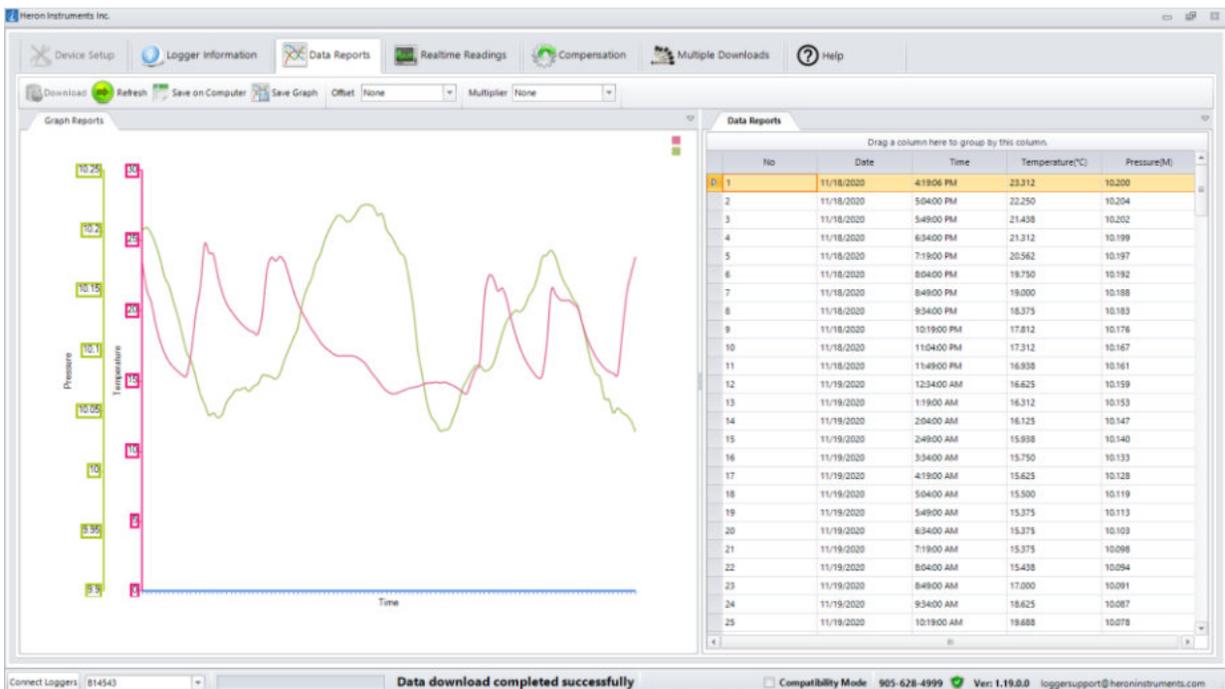
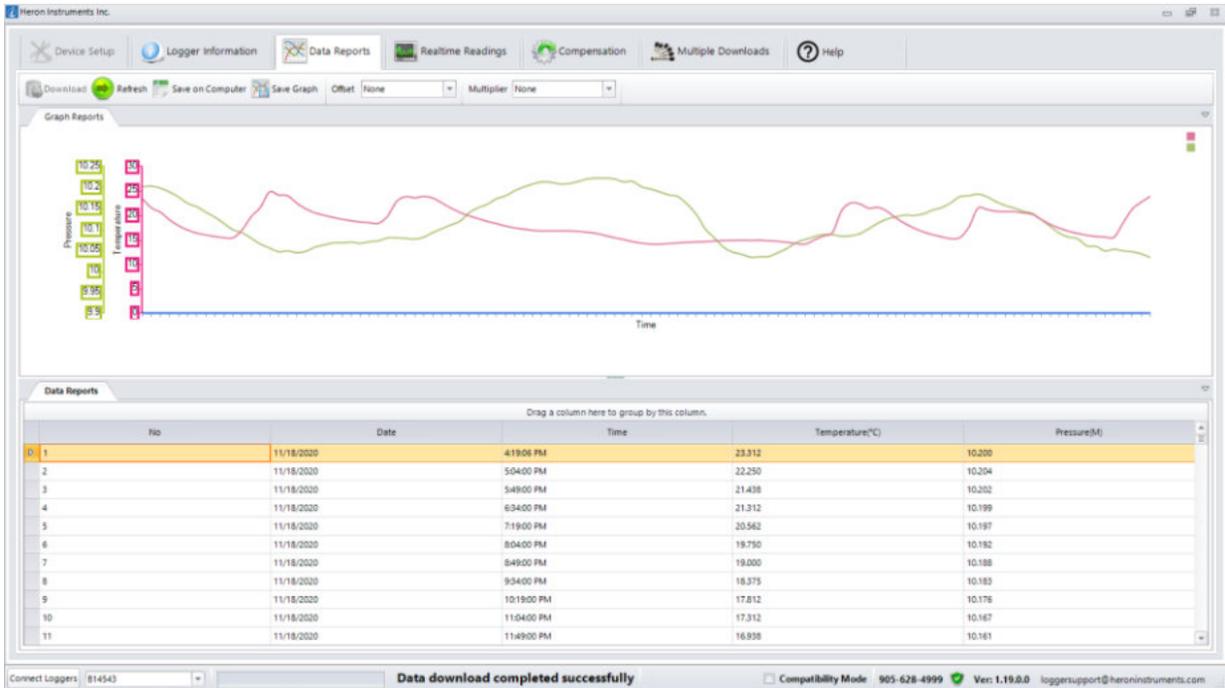
Zero Logger: Zero logger resets the logger's pressure sensor to ambient pressure.



Data Reports

Within the “Data Reports” tab, you will see a graphical representation of the data stored on the logger’s memory. This includes pressure and temperature readings over the span of the mission. Once on the data reports page, click the “Download” button in the top left of the screen. The logger will begin to transfer its data into the dipperLog Software.

Once finished downloading the data, the data will be displayed in both a line graph format, and a table format. The data within the table can be manipulated and sorted to suit your needs. To change layout, simply click and drag either the “Graph Reports” or “Data Reports Tab” to your desired layout.



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Data Reports - Continued

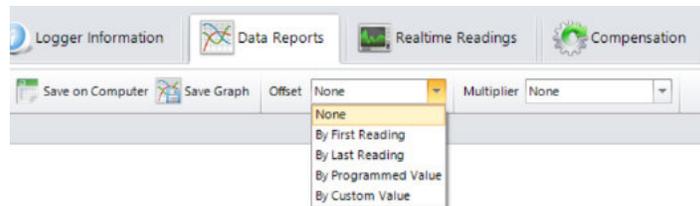
Refresh: Re-downloads data incorporating any newly recorded data points since last download.

Save on Computer: Clicking save on computer allows you to export the data represented in the table on the dipperLog Software. You can export as either a Comma Separated File (.csv), or as a Text File (.txt).

Save Graph: Clicking save graph allows you to export the data represented in the line graph on the dipperLog Software. You can export as either a PNG (.png) or JPEG (.jpeg) image.

Data Reports - Advanced Features

PLEASE NOTE: When using these features in the “Data Reports” tab, the adjustments can be made at any time, before downloading the data or while viewing the data after download. When using these features in the “Multiple Download” tab, the adjustments must all be selected prior to download.



This feature is used to offset the recorded data by one of the following values:

First Reading:

In cases where no barLog data is available but your dipperLog was started before placement in well, this option allows you to use that first recorded barometric pressure reading to compensate all subsequent data points. This will not adjust your data for barometric influences over the time of the recordings, it will simply remove a constant value representing an approximate barometric pressure.

Last Reading:

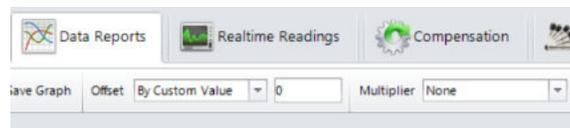
This option works the same way as the “First Reading” choice with the exception of using the last recorded data point for the calculations. If your dipperLog recorded the first data point when submerged because of a delayed start, this allows you to use the last reading as an alternate barometric pressure value.

Programmed Value:

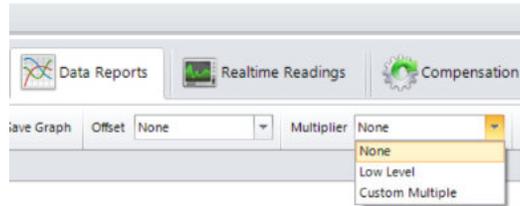
This selection will use the saved “barometric” value that the dipperLog stores when initially started. This is the same value that is used to calculate the Real Time reading value. This stored value will change every time the dipperLog is reprogrammed and re-started.

Custom Value:

When this option is selected a new field becomes available which enables the user to enter a constant value by which to offset the recorded values in memory. This could be an average barometric pressure reading from a local weather station or news channel.



Data Reports - Advanced Features - Continued



Low Level:

This selection will multiply all downloaded readings by 0.9

Custom Value:

This option allows you to select a constant value by which to adjust your readings. Since 1 is the specific gravity of clean water, the software calculates the height of water using 1 as the density. This option allows you to make the necessary adjustment when the fluid you are monitoring has a density of more or less than 1, i.e. seawater or brackish water.

"While density of pure water at 4 degrees Celsius is equal to 1, the density of seawater ranges over somewhat higher values, which vary with proximity to shores, rivers, etc., as well as with geographic location & depth. Representative average values are 1.026– 1.028," Van Nostrand's, Scientific Encyclopedia 7th edition. Canada, 1989: 2046.

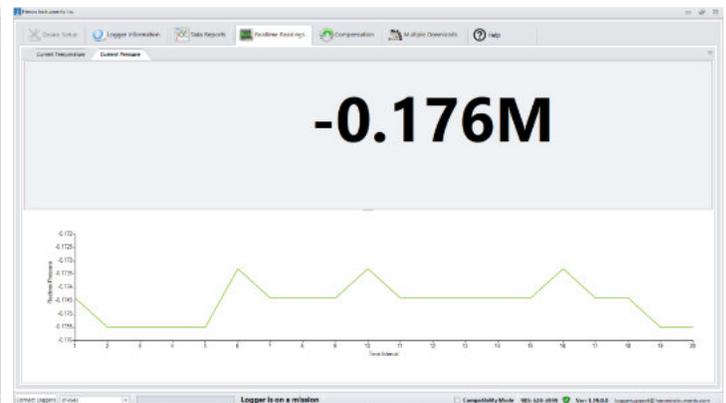
You could also adjust your data for altitude using this option. Simply define a factor based on the height above sea level of your job site and enter it in the custom value field.

Realtime Readings

With a logger connected, the "Realtime Readings" tab will display the realtime pressure (In either Meters or Feet depending on your computer's settings.) and temperature (°C or °F) readings being recorded at that exact moment.

Note: The graph is a rolling 20 second history.

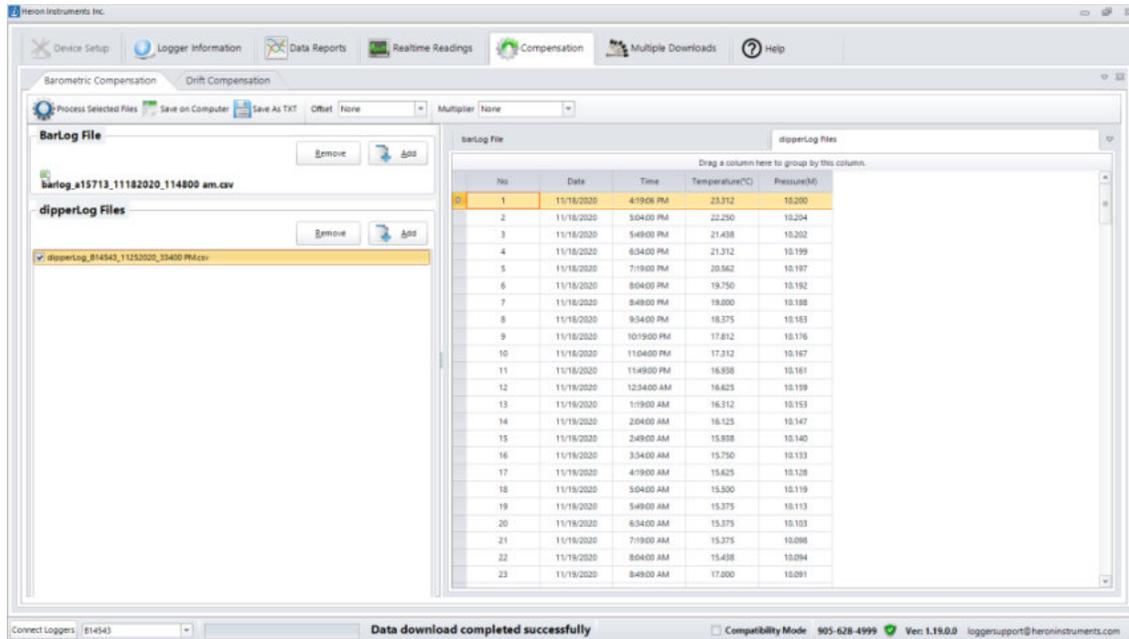
Note: Viewing these reports is customizable, similarly to the "Data Reports" tab.



dipperLog+ Series User/Software Manual

Compensation

Barometric:



This operation can be done at any time. It is not necessary to be connected to any logger.

Select the “Compensation” tab.
Select “Add” under the barLog File section.
Navigate to location where downloaded data sets are saved.
Select barLog data to be used in compensation.
Select “Open” to import files.

Select “Add” under the dipperLog Files
Navigate to location where downloaded data sets are saved.
Select dipperLog data to be compensated.
Select “Open” to import file(s).

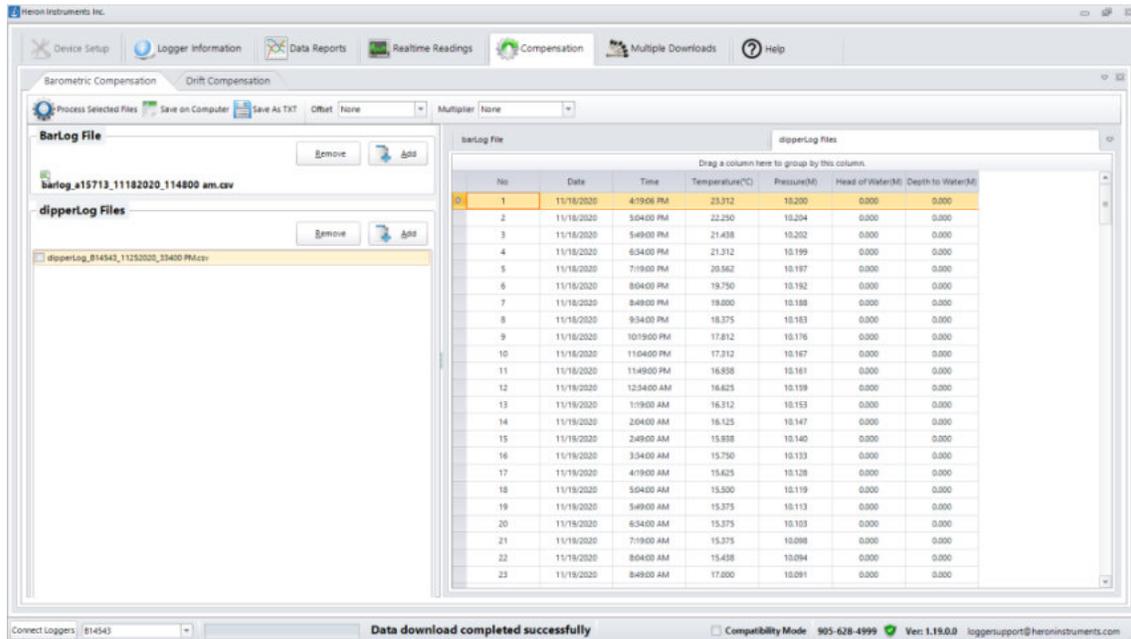
Note: barLog and dipperLog files must be imported separately.

Data sets may be viewed in table on right when highlighted.

Select data sets to be compensated by placing check mark in the corresponding box.

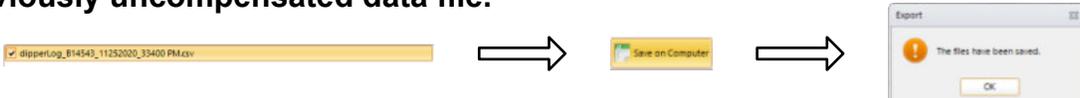
Select “Process Selected Files” to begin compensation.
You will be asked to confirm this operation.

Compensation - Barometric - Continued



Once the compensation is completed the data will be displayed on screen.

Note: Add check marks to the boxes, and select “Save on Computer” to overwrite the previously uncompensated data file.



The compensated data will now display two additional columns of values:
Head of Water – Pressure recorded with the barometric pressure removed
Depth to Water – Transducer depth entered less head of water

The depth to water reading can be verified with a Water Level Meter.

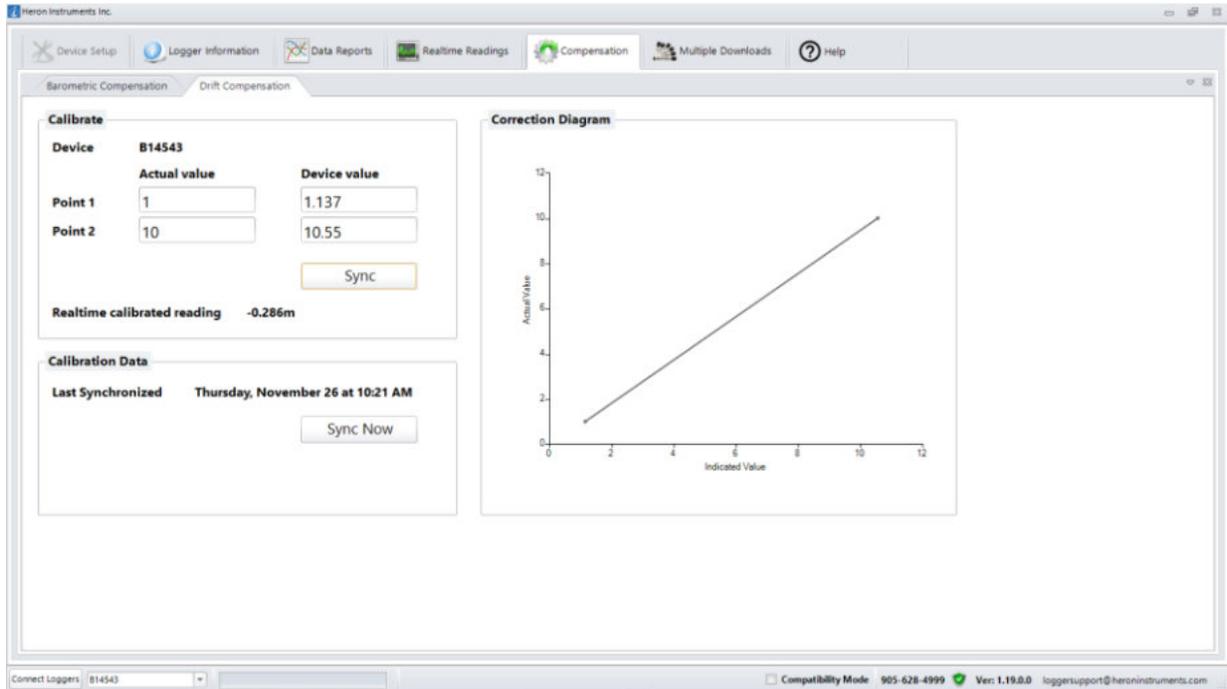


dipperLog+ Series User/Software Manual

Compensation

Drift:

Located in the Compensation tab, this screen gives the user the ability to fine tune their readings. You can correct the values for any drift which may have occurred over time and also reduce the calibrated range of readings for greater accuracy.



1. Select the minimum and maximum point of the range desired - Both values must be within the logger's original range.
2. Enter the real time reading of the dipperLog at both these points in the device value fields (For above example: 1.137 & 10.55)
3. Select "Sync" to establish correct calibration factor

This correction can be applied by activating the drift compensation on the Data Reports tab at any time; however, it must be selected before download on the Multiple Download tab for it to be applied to the data.

The "Sync Now" button will cause this calibration factor to be uploaded to the cloud where it can be accessed and applied to any data downloaded from this dipperLog. The calibration data of the last synchronization will be displayed when this option is exercised.

Note: Most useful for applications with extremely low water levels.

Note: In order to update calibration data, your device must be connected to the internet.

Multiple Downloads

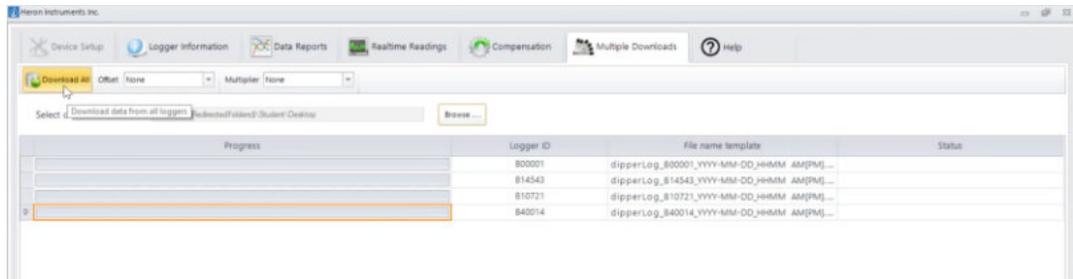
If you have multiple dipperLogs connected and listed in the text box on your screen select “Multiple Downloads”

Browse to desired data storage location.

You can create a new folder for data.

Download will not proceed until destination folder selected.

Then select “Download All”.



All dipperLogs listed in the main window will be downloaded simultaneously, with individual progress bars indicating the speed of the download.

Once all downloads have been completed, the data files in CSV format will be exported to the designated destination folder with no further input from you.

If data needed in Text format, dipperLog must be downloaded and saved individually or saved using the “Save as TXT” option on the barometric compensation screen.

Help

Within the “Help” tab you will find a number of helpful resources to help you to use the dipperLog Software.

- Ensure you are running the latest version of the software by clicking the “Check for Software Update”. If you already have the latest, it will say “You’re up to date!”
- Troubleshooting tips
- dipperLog Software Manual in PDF format
- Heron Instruments Annual Product Catalogue
- dipperLog Software Overview Video

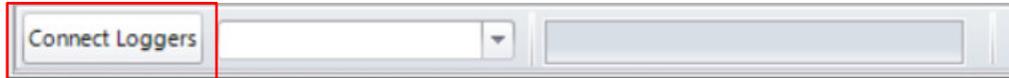
dipperLog+ Series User/Software Manual

Using dipperLog Software

Connecting a Logger to the Software

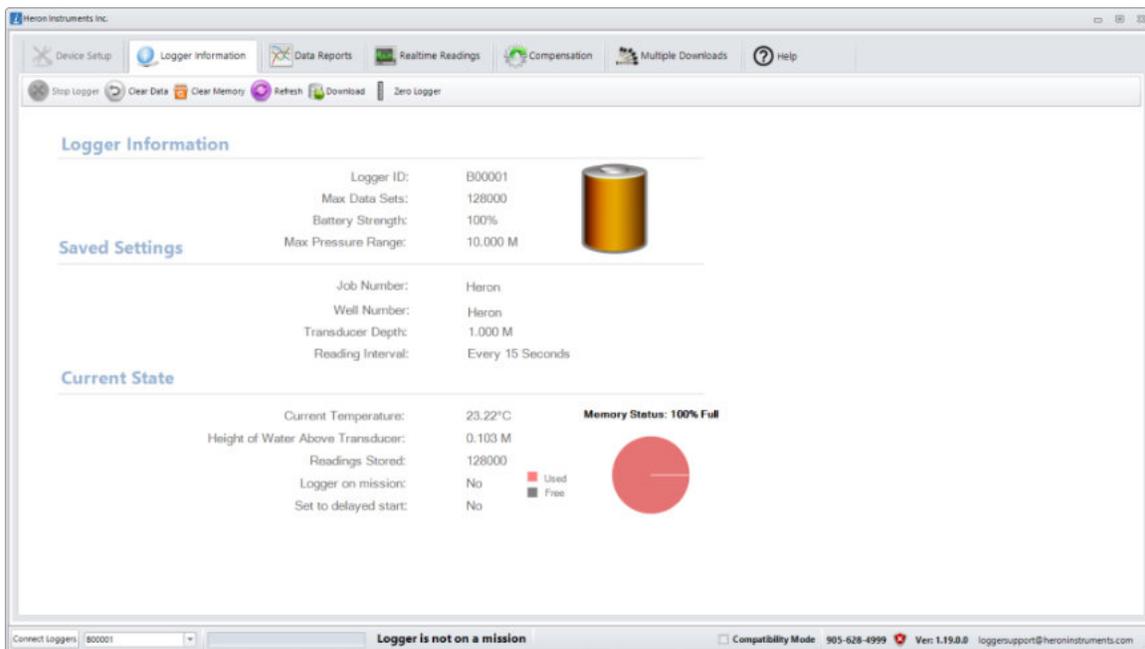
Launching the software will generate the Logger Information screen. Connect the PC communication cable to your computer and 1 or more dipperLog. Each dipperLog requires a dedicated cable and USB port.

Select “Connect Loggers” in the bottom left hand corner.



A listing of any connected dipperLog is available in the adjacent drop box. This box shows ID number of the dipperLog whose settings are currently being displayed. The selected dipperLog information will be displayed.

Selecting a new ID number from the list display will update the screen to display the new settings.



Logger ID: Serial Number of connected logger

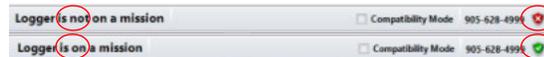
Max Data Sets: Memory capacity

Battery Strength: Remaining battery %

Max Pressure Range: Calibrated maximum pressure of transducer (Not to be exceeded)

Memory Status: Memory space available

Status of dipperLog: Logger’s mission status



Note: If dipperLog memory is clear, the “Device Setup” tab will be displayed.

To program a dipperLog, navigate to “Device Setup.”

If this option is not available, select “Clear Memory” within the Logger Information tab.

Note: Make sure you have a backup of data before clearing memory.

Logging Method Descriptions

Linear

Linear log type measures and records at a user-defined fixed interval of one minute or more. This method is used for long-term studies, landfill monitoring, stream gauging, tidal studies, and background monitoring prior to aquifer testing. Intervals are measured in days, hours, or minutes.

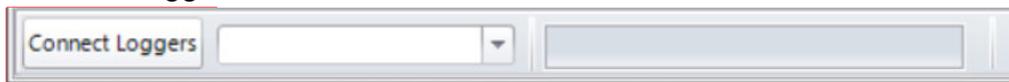
Log

Log type measures and records the first reading at 1 second, with 1 second added to each subsequent reading interval for 255 readings.

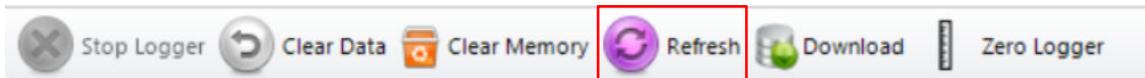
Downloading Data to PC

If the dipperLog is deployed on a direct read downhole cable, connect the PC communication cable at the well head, otherwise retrieve dipperLog from the deployment location and connect the PC communication cable directly to the dipperLog.

1. Launch the dipperLog Software.
2. Connect a PC Communication Cable to your PC and the other end to the dipperLog or well head reader.
3. Select “Connect Loggers” in the bottom left corner of the screen.



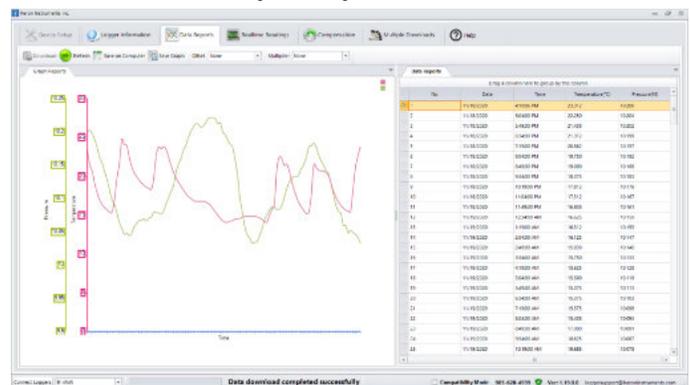
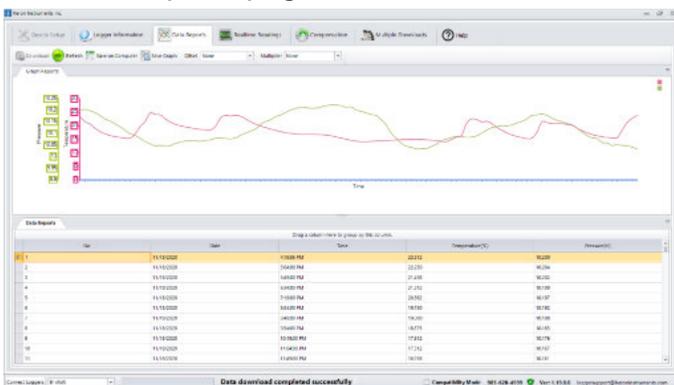
4. If you have multiple loggers connected to multiple PC Communication Cables, the dropdown list to the right of the “Connect Loggers” button will contain all of your connected loggers. The logger highlighted within the list, is the information that will be displayed on the “Logger Information” tab.
5. Click “Download” and the selected logger will begin to download.



- a. Data in memory will be downloaded and displayed.
- b. Download will not cause the mission to be stopped or paused.
- c. Download will not cause the data to be erased from the memory
- d. Data will not be saved upon download, this must be done manually.
- e. Pressure and temperature data will be displayed on the same graph.

Once downloaded, the “Data Reports” tab will open and display both graphical and tabular representations of collected readings.

The data reports page can be customized to display the data in a variety of layouts.



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The “Refresh” button will re-download data incorporating any newly recorded data points since the last download.

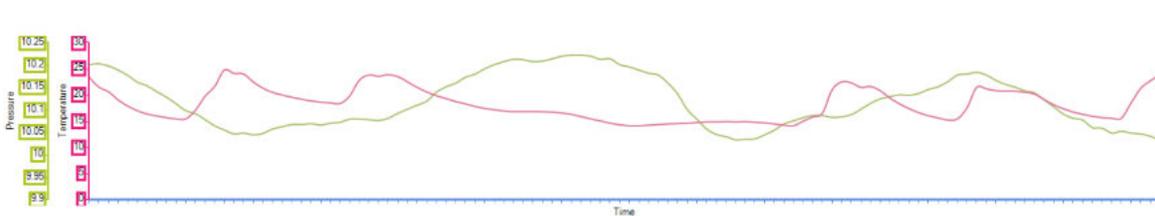


The “Save on Computer” button allows you to designate the location where the data is saved. Navigate to desired location, name the data set and select “Save.”

If you wish to save the data as a .txt file, select “text (tab delimited)” from dropdown menu in “Save as type” field.

You may now view the data in an Excel spread sheet or text file if desired.

“Save Graph” will allow you to save the graph at your specified location.



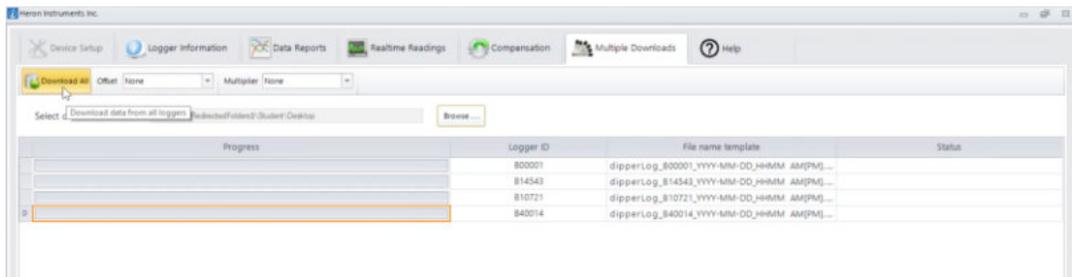
Your dipperLog is now ready to be re-deployed or return to “Logger Information” for further options.

Multiple Downloads

If you have multiple dipperLogs connected and listed in the text box on your screen select “Multiple Downloads” from the top bar.

Select “Browse” and navigate to desired data storage location. You can create a new folder for data. **Download will not proceed until destination folder selected.**

Click “Download All.”



All of the dipperLogs listed will be downloaded simultaneously, with individual progress bars indicating the speed of the download.

Once all downloads have been completed, the data files in CSV format will be exported to the destination folder with no further input from you.

If data needed in Text format, dipperLog must be downloaded and saved individually or saved using the “Save as TXT” option on the barometric compensation screen.

Cleaning and Maintenance

Overview

What to Expect From Your dipperLog Groundwater Data Logger

As with any groundwater or surface water monitoring project, you should determine the best instrument to use, and how to maintain that instrument, based on the monitoring environment specific to your application. When using dipperLogs, ensure the monitoring temperatures are within the logger's specifications. Make sure that the wetted materials of your dipperLog are compatible with the site's chemistry, and determine the proper deployment method for the job. A maintenance schedule and precautionary measures should be implemented, especially if exposing your dipperLogs to environments you expect to be harsh on instrument sensors.

Selecting the Proper dipperLog

Heron dipperLogs are available in a variety of pressure ranges, from:

- (B) 10m/30ft
- (C) 30m/100ft
- (D) 60m/200ft
- (E) 120m/400ft

The dipperLog can withstand 2x overpressure, however outside the stated pressure range, accuracy cannot be guaranteed. This can also damage the sensor.

A temperature detector is used to accurately compensate for temperature changes, within the range of 0°C to 50°C for the dipperLog line. Your dipperLog will record pressure and temperature in its thermal range of -20°C to 80°C, however, outside the compensation range, readings will be less accurate. Using beyond the thermal range may cause damage to the logger.

dipperLog specification sheets contain a list of wetted materials to help check for chemical compatibility with the monitored water. Prior to deploying your dipperLog, you can check the chemical compatibility of the wetted materials by obtaining a sample of the water you will be monitoring in, and measuring the chemicals of concern for your site. This can be done by attaching a bailer to a dipper-Tag multipurpose tag line, and retrieving your sample.

Placing your dipperLog in the sampled water for a closely monitored test period, although actual expected pressure and temperature conditions may not be emulated, it will give you a good idea of how your dipperLog will react/perform in the chemical environment of that site. This test can be used for all of our products, including: water level meters, inspection cameras, oil/water interface meters and data loggers.

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Scheduling Maintenance

If you are unsure of how your dipperLog will perform in your site's environment, we recommend you to schedule site inspections and physically examine your dipperLogs and their function periodically during the course of the deployment.

NOTE: If you do not check your site regularly, you will not know how the monitoring environment is affecting your equipment.

Each time that you inspect your dipperLog it is recommended that you take manual water level measurements. These measurements can be logged and compared to the readings of the dipperLog to ensure the dipperLog is performing properly. If your readings are not accurate, it may be time to clean your dipperLog. Sensors will experience some longterm drift from their original calibrated state, but not following the maintenance suggestions in this document could cause sensors to be less accurate at a quicker rate.

Manual measurements can be taken using a Heron dipper-T Water Level Meter. These measurements can then be compared to the readings of the dipperLog to ensure accuracy over time.

Determining how often you visit your site is based on your monitoring environment. In good quality freshwater, like a municipal production well, inspecting a dipperLog and taking manual readings may be done once a season; whereas physical cleaning of the dipperLog may only need to be cleaned once a year. Meanwhile, in harsher environments, like a contamination site, inspections and cleaning should be more often.

NOTE: Your maintenance schedule will be based on your past experience, familiarity with the monitoring site, and results of previously scheduled site inspections.

Preventative Maintenance

If you are familiar with the conditions of your monitoring site, and know you are going to require extra corrosion resistance, or protection from ice accumulation, there are precautionary steps that can be taken.

To prevent icing, the easiest method is to lower the dipperLog to a point in the water column below the frost line or ice formation depth. In shallow streams, wetlands or ponds where icing/ freezing may reach to the bottom, install the dipperLog in a vented stilling well embedded into the bottom of the water body beyond the frost line. Alternatively, place the dipperLog inside, rubber balloons filled with a non-toxic, non-corrosive anti-freeze solution or saltwater solution (dipperLog-TOUGH only). The anti-freeze solution will protect the dipperLog from ice expansion; yet transmit any pressure and temperature fluctuations.

Maintaining dipperLogs

Generally, cleaning your dipperLog consists of rinsing and using a mild, non-residual, non-abrasive, household cleaner with a very soft plastic bristled brush.

Do not insert any object through the pressure transducer holes at the sensor end of the dipperLog.

To help get the most out of your Heron dipperLog, purchase the dipperLog Maintenance Kit (PN# 5024) to keep your dipperLogs accurate and performing at their peak for many years.

The maintenance kit consists of:

- 5x packs of Alconox® Powdered Precision Cleaner
- 25x Replacement O-Rings
- O-Ring Applicator Guide & Pick
- Cleaning Cloth
- Rubber Gloves



NOTE: This Maintenance Kit is designed specifically for the dipperLog 64+, dipperLog VENTED+, dipperLog 32+, 4-20mA Pressure Transmitter and barLog. Upon inspection, if you come across damaged O-Rings in a dipperLog TOUGH+, contact us at loggersupport@heroninstruments.com

Some Cases May Require Specific Maintenance

Hard Water: Hard water can result in the precipitation of calcium and magnesium deposits on the dipperLog body and pressure transducer. These deposits can be dissolved using a diluted solution ($\leq 10\%$) of acetic or phosphoric acid. Store-bought products designed for household use can also be used.

Suspended Solids: High suspended solid loads may block the pressure transducer holes or clog the internal pressure cell. To minimize this, dipperLogs should be placed in areas with higher flow. Simply rinse the dipperLog holes to remove any particles.

Bacteriological or Chemical Fouling: Sessile bacteria, other microorganisms, barnacles, mussels and algae can buildup on the dipperLog body, as well as the sensors. Chemical deposits can also be a result of electrical charge differential between the dipperLog and the monitored liquid. Both forms of fouling can be removed by soaking in a diluted ($\leq 10\%$) solution of sulphuric acid. Hard-to-remove deposits may require several hours of soaking.

O-Ring Damage: There are o-rings on the dipperLog's communication ends and in the dipperLog caps, which are designed to prevent leaks. Depending on your application, you may be unscrewing the caps and/or direct read cables from the dipperLog communication end more frequently. This could result in damage to the o-rings. These o-rings should be inspected regularly and replaced as required (contact Heron for replacements).

Storage Tips: Before storing dipperLogs for any extended period, they should be stopped from recording (using the dipperLog Software), cleaned as described above, and stored with the cap on to prevent unintended moisture intrusion.

dipperLog+ Series User/Software Manual

Troubleshooting/FAQ

Q. Where is the data download button?

A. On both the Logger Information and Data Reports tab the “Download” button is in the header bar. The “Download All” option is only available on Multiple Downloads tab.

Q. Does the software have a dedicated data base?

A. No, you must establish your own location for the downloaded data to be saved.

Q. Once I have downloaded my data where is it saved?

A. You must establish the location where you want the data to be saved after selecting “Save on Computer”. You can opt to save in “text” format at this time. In the case of multiple downloads, you must indicate this location prior to downloading and the data is saved automatically. The default format is “CSV”.

Q. Can I save my data as a text file?

A. Yes. Go to the “Compensation” screen. Add the file you wish to save as text and the data will be displayed. Select the file to be saved by checking the box then “Save as TXT”. You do not need to compensate your data to perform this operation. You can save multiple data sets at the same time.

Q. Can I change my units of measure in the software?

A. The software displays the data in the units designated in your computer settings. If you go to the control panel of your computer, select Region and Language and then select Additional Settings, you will access the format screen. The software will use whatever units are selected in this template. Because the display units are determined by your computer settings and not the software, if someone sends you a file of dipperLog data that they downloaded and saved in metric, if your computer settings indicate imperial units, the data will be converted when the file is opened. The data will always be displayed in your measurement system of choice. You can also change them in the Excel spreadsheet after the data has been saved. If done through Excel you do not have to adjust your computer settings and can select units not available as an option in computer settings.

Q. What units are available in the software?

A. You may choose between metric and imperial units in your computer format. For other units such as PSI, you must make the change using Excel.

Q. Why do I only have pressure measurements?

A. Your data has not been compensated for barometric pressure effects. Once this compensation has been performed the height of water and depth to water calculations will be performed and values displayed.

Q. How do I compensate my data?

A. Refer to Barometric Compensation.

Q. Must I have a barLog data set to compensate my data?

A. To perform an accurate compensation a barLog data set should be used. If no barLog data is available, by indicating the data sets you wish to compensate and then selecting “Process Selected Files” the software will perform the compensation calculations using the first recorded pressure value as the default barometric pressure. This procedure assumes the dipperLog was not started while submerged.

Q. May I compensate multiple data sets at the same time?

A. Yes, however a separate compensation must be performed with each barLog data set as only one can be chosen at any time.

Q. Will downloading my data stop my dipperLog?
A. No. You must manually stop the recording by using “Stop Logger” on the “Logger Information” tab.
Note: Once the logger is stopped, it cannot be started again without inputting a new mission.

Q. Will downloading my data clear the memory of the dipperLog?
A. No. Return to the “Logger Information” tab. Once there you may choose to “Clear Memory”. This action will stop the dipperLog if not done previously.

Q. When the memory is full will the dipperLog overwrite with the new data?
A. No, when the memory is full the dipperLog will stop recording.

Q. How long will it take to fill the memory?
A. dipperLogs with a maximum capacity of 32,000 data points will be full in:

Time to Fill 128k	Time to Fill 64k	Time to Fill 32k	Reading Frequency
1.5 Days	17.8 Hours	8.9 Hours	Every 1 Second
22 Days	11 Days	5.5 Days	Every 15 Seconds
89 Days	44 Days	22 Days	Every 1 Minute
1.2 Years	222 Days	111 Days	Every 5 Minutes
3.65 Years	1.82 Years	333 Days	Every 15 Minutes
7.3 Years	3.65 Years	1.82 Years	Every 30 Minutes
14.6 Years	7.3 Years	3.65 Years	Every 1 Hour

Q. Can I reproduce the graph in the software when the dipperLog is not connected?
A. No. Once the dipperLog has been disconnected the graph must be created either by downloading the data again or using Excel or some other third party software application to recreate it.

Q. What operating systems is the software compatible with?
A. The software will work on Windows 7, Windows 8 & Windows 10.
Note: The software is only tested and debugged on Windows 10.

Q. Will my current loggers work with this new software?
A. Yes. All dipperLog are compatible with this software. Use the compatibility mode option for connecting to legacy versions of loggers. See Legacy Series II dipperLog for more info.

Q. Do I require a separate barLog for each dipperLog deployed?
A. No, you can compensate multiple dipperLog data sets with a single barLog. To guarantee accuracy, the barLog should be deployed within 5 km of the dipperLog and at a similar elevation. We recommend an optimal ratio of 1 barLog for every 10 dipperLog deployed.

Q. Are the batteries in the dipperLog replaceable?
A. No. Once the battery in the dipperLog is dead the entire unit must be replaced.

Q. Is any data in memory lost when battery dies?
A. No. The dipperLog has an internal non-volatile memory. Heron Instruments is usually able to retrieve the data from dipperLog with dead batteries. A service fee may be charged for this service.

Q. How many dipperLog can I connect at one time?
A. As many as you have PC communication cables connected.

Q. Where can I find which dipperLog are connected?
A. The drop down box in the lower left corner of the Logger Information Screen will display the listing of connected dipperLog. The highlighted Serial Number is the information displayed on the screen.

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Troubleshooting/FAQ - Continued

Legacy Series II dipperLog

If you have any of our older “Series II” dipperLog, this software package is backwards compatible and will work with these dipperLog. The older technology incorporated in these units is much slower and cannot communication at the increased speed of today’s dipperLog. In order to communicate and download data from these older dipperLogs you must adjust the response time of the software.



By placing a check in the “Compatibility Mode” box, found at the bottom right of the screen, the software will be slowed enough to enable this communication.

WARNING: If this box is checked when communicating with new dipperLogs/barLogs the communication will be extremely slow.

dipperLog Troubleshooting

1. Make sure your logger is properly connected to your computer. If it is on a detachable cable, consider removing it from the cable and attaching the PC Communication cable directly to your logger.
2. Make sure you have the latest software version. The latest version of our software will include the latest features, and bug fixes.
3. Try using a different computer. Sometimes issues can be isolated to specific computers.
4. If you are having issues with data being used across multiple computers, make sure those computers have the same regional settings. This can be found in Windows settings.
5. Try connecting to a different logger or use a different PC-Com cable. This can help you narrow down where any issues may occur.
6. Double check your deployment. If your data does not look right, make sure of your settings and your deployment method. Did you compensate your data? Did you account for elevation or density?
7. Check the manual to learn about your equipment.

In-Depth Technical Specifications

dipperLog 128+, Vented+, and barLog	
Memory	128,000 readings
Download Speed	19,200bps (128,000 readings downloads in 6 minutes)
Factory Calibrated Ranges	10m(aprx. 30ft), 30m(aprx. 100ft), 60m(aprx. 200ft), 120m(aprx. 400ft)
Operational Range	10m(aprx. 30ft), 30m(aprx. 100ft), 60m(aprx. 200ft), 120m(aprx. 400ft) All ranges are representative of use at sea level. Use above sea level will result in higher operational range.
Overpressure Rating	2X Factory Calibrated Range
Operating Temperature	-20°C to 80°C
Battery	Lithium Cell
Battery Life (Readings)	up to 5 million (depending on usage)
Battery Life (Max)	Up to 15 Years (depending on usage)

Temperature	Test Condition	Typical	Max
Temperature Accuracy Typical	-20°C to +50°C	+/-0.05°C	+/-0.1°C
	-40°C to +70°C	+/-0.05°C	+/-0.15°C
	-40°C to +100°C	+/-0.1°C	+/-0.2°C
	-55°C to +125°C	+/-0.1°C	+/-0.25°C
	-55°C to +150°C	+/-0.1°C	+/-0.3°C
Temperature Resolution	0.0078°C		
Temperature Reading Range	-55°C to +150°C		
Temperature compensated range	0°C to 50°C		
Temperature Response Time	2 minutes		
Lifetime Temperature Stability	300 hours continual reading at 150°C		+/-0.03°C
Temperature Repeatability	8 Averages		+/-0.0078°C
Temperature cycling and hysteresis	8 Averages		+/-0.0156°C
Temperature sensor meets ASTM E1112 and ISO 80601-2-56. Nist Traceability.			

Pressure/Water Level	Test Condition	Typical	Max
Water Level Accuracy (Typical)	+/-0.05%FS (0°C to 50°C)		
Water Level Accuracy (Max Error)	+/-0.1%FS (0°C to 50°C)		
Water Level Resolution	0.001%FS		
Pressure Accuracy	Typical error band of +/-0.3%FS		
Pressure Response Time	100ms		
Pressure Stability	500,000 pressure cycles from 0% to 50%FS	+/-0.05%FS/y	+/-0.1%FS/y
Realtime clock crystal accuracy	32,768Hz +/- 10ppm		
Wetted Material	316 Stainless Steel, Delrin® & Rubber Buna (PFAS free Wetted Materials)		
O-Rings	Rubber Buna Primary Seals, Viton Secondary Seals.		
Transducer Material	316 Stainless Steel, Piezoresistive Silicon		
Length	145mm		
Diameter	22mm		
Weight	170g		
Logging Modes	Linear, and predetermined Log		
Launch modes	Immediate and future start/stop		
Environmental Rating	IP68		
Certification	CE		
Communication Interfaces	USB via Heron Com-Cable		
Programing	Desktop Application (Windows 10 x86)		
Logging Intervals	1 second to 255 hours		
Supported Pressure Units	Meters, Feet		
Supported Temperature Units	Celsius, Ferhenheit		

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dipperLog Tough+	
Memory	128,000 readings
Download Speed	19,200bps (128,000 readings downloads in 6 minutes)
Factory Calibrated Ranges	10m(aprx. 30ft), 30m(aprx. 100ft), 60m(aprx. 200ft), 120m(aprx. 400ft)
Operational Range	10m(aprx. 30ft), 30m(aprx. 100ft), 60m(aprx. 200ft), 120m(aprx. 400ft) All ranges are representative of use at sea level. Use above sea level will result in higher operational range.
Overpressure Rating	2X Factory Calibrated Range
Operating Temperature	-20°C to 80°C
Battery	Lithium Cell
Battery Life (Readings)	up to 5 million (depending on usage)
Battery Life (Max)	Up to 15 Years (depending on usage)

Temperature	Test Condition	Typical	Max
Temperature Accuracy Typical	-20°C to +50°C	+/-0.05°C	+/-0.1°C
	-40°C to +70°C	+/-0.05°C	+/-0.15°C
	-40°C to +100°C	+/-0.1°C	+/-0.2°C
	-55°C to +125°C	+/-0.1°C	+/-0.25°C
	-55°C to +150°C	+/-0.1°C	+/-0.3°C
Temperature Resolution	0.0078°C		
Temperature Reading Range	-55°C to +150°C		
Temperature compensated range	0°C to 50°C		
Temperature Response Time	2 minutes		
Lifetime Temperature Stability	300 hours continual reading at 150°C		+/-0.03°C
Temperature Repeatability	8 Averages		+/-0.0078°C
Temperature cycling and hysteresis	8 Averages		+/-0.0156°C
Temperature sensor meets ASTM E1112 and ISO 80601-2-56. Nist Traceability.			

Pressure/Water Level	Test Condition	Typical	Max
Water Level Accuracy (Typical)	+/-0.05%FS (0°C to 50°C)		
Water Level Accuracy (Max Error)	+/-0.1%FS (0°C to 50°C)		
Water Level Resolution	0.001%FS		
Pressure Accuracy	Typical error band of +/-0.3%FS		
Pressure Response Time	100ms		
Pressure Stability	500,000 pressure cycles from 0% to 50%FS	+/-0.05%FS/y	+/-0.1%FS/y
Realtime clock crystal accuracy	32,768Hz +/- 10ppm		
Wetted Material	Titanium, Delrin® & Teflon.		
O-Rings	Transducer: Primary and Secondary are Teflon Encapsulated Viton. Cap: Primary is Teflon, secondary is Viton.		
Transducer Material	Titanium, Piezoresistive Silicon		
Length	145mm		
Diameter	22mm		
Weight	150g		
Logging Modes	Linear, and predetermined Log		
Launch modes	Immediate and future start/stop		
Environmental Rating	IP68		
Certification	CE		
Communication Interfaces	USB via Heron Com-Cable		
Programming	Desktop Application (Windows 10 x86)		
Logging Intervals	1 second to 255 hours		
Supported Pressure Units	Meters, Feet		
Supported Temperature Units	Celsius, Fahrenheit		

In-Depth Technical Specifications - Continued

dipperLog 64+	
Memory	64,000 readings
Download Speed	19,200bps (64,000 readings downloads in 3 minutes)
Factory Calibrated Ranges	10m(aprx. 30ft), 30m(aprx. 100ft), 60m(aprx. 200ft), 120m(aprx. 400ft)
Operational Range	10m(aprx. 30ft), 30m(aprx. 100ft), 60m(aprx. 200ft), 120m(aprx. 400ft) All ranges are representative of use at sea level. Use above sea level will result in higher operational range.
Overpressure Rating	2X Factory Calibrated Range
Operating Temperature	-20°C to 80°C
Battery	Lithium Cell
Battery Life (Readings)	up to 3.75 million (depending on usage)
Battery Life (Max)	Up to 10 Years (depending on usage)

Temperature	Test Condition	Typical	Max
Temperature Accuracy Typical	-20°C to +50°C	+/-0.5°C	+/-0.5°C
	-40°C to +70°C	+/-0.5°C	+/-0.5°C
	-40°C to +100°C	+/-0.5°C	+/-0.5°C
	-55°C to +125°C	+/-0.5°C	+/-0.5°C
	-55°C to +150°C	+/-0.5°C	+/-0.5°C
Temperature Resolution	0.01°C		
Temperature Reading Range	-20°C to +80°C		
Temperature compensated range	0°C to 40°C		
Temperature Response Time	5 minutes		
Lifetime Temperature Stability	300 hours continual reading at 150°C		+/-0.3°C
Temperature Repeatability	8 Averages		+/-0.01°C
Temperature cycling and hysteresis	8 Averages		+/-0.02°C

Pressure/Water Level	Test Condition	Typical	Max
Water Level Accuracy (Typical)	+/-0.05%FS (0°C to 50°C)		
Water Level Accuracy (Max Error)	+/-0.1%FS (0°C to 50°C)		
Water Level Resolution	0.001%FS		
Pressure Accuracy	Typical error band of +/-0.3%FS		
Pressure Response Time	500ms		
Pressure Stability	500,000 pressure cycles from 0% to 50%FS	+/-0.05%FS/y	+/-0.1%FS/y
Realtime clock crystal accuracy	32,768Hz +/- 10ppm		
Wetted Material	316 Stainless Steel, Delrin® & Rubber Buna (PFAS free Wetted Materials)		
O-Rings	Rubber Buna Primary Seals, Viton Secondary Seals.		
Transducer Material	316 Stainless Steel, Piezoresistive Silicon		
Length	145mm		
Diameter	22mm		
Weight	170g		
Logging Modes	Linear, and predetermined Log		
Launch modes	Immediate and future start/stop		
Environmental Rating	IP68		
Certification	CE		
Communication Interfaces	USB via Heron Com-Cable		
Programming	Desktop Application (Windows 10 x86)		
Logging Intervals	1 second to 255 hours		
Supported Pressure Units	Meters, Feet		
Supported Temperature Units	Celsius, Fahrenheit		

dipperLog+ Series User/Software Manual

dipperLog 32+	
Memory	32,000 readings
Download Speed	19,200bps (32,000 readings downloads in 1.5 minutes)
Factory Calibrated Ranges	30m(aprx. 100ft)
Operational Range	30m(aprx. 100ft) Representative of use at sea level. Use above sea level will result in higher operational range.
Overpressure Rating	2X Factory Calibrated Range
Operating Temperature	-20°C to 80°C
Battery	Lithium Cell
Battery Life (Readings)	up to 2.5 million (depending on usage)
Battery Life (Max)	Up to 5 Years (depending on usage)

Temperature	Test Condition	Typical	Max
Temperature Accuracy Typical	-20°C to +50°C	+/-0.5°C	+/-0.5°C
	-40°C to +70°C	+/-0.5°C	+/-0.5°C
	-40°C to +100°C	+/-0.5°C	+/-0.5°C
	-55°C to +125°C	+/-0.5°C	+/-0.5°C
	-55°C to +150°C	+/-0.5°C	+/-0.5°C
Temperature Resolution	0.01°C		
Temperature Reading Range	-20°C to +80°C		
Temperature compensated range	0°C to 40°C		
Temperature Response Time	5 minutes		
Lifetime Temperature Stability	300 hours continual reading at 150°C		+/-0.3°C
Temperature Repeatability	8 Averages		+/-0.01°C
Temperature cycling and hysteresis	8 Averages		+/-0.02°C

Pressure/Water Level	Test Condition	Typical	Max
Water Level Accuracy (Typical)	+/-0.1%FS (0°C to 40°C)		
Water Level Accuracy (Max Error)	+/-0.2%FS (0°C to 40°C)		
Water Level Resolution	0.01%FS		
Pressure Accuracy	Typical error band of +/-0.3%FS		
Pressure Response Time	500ms		
Pressure Stability	500,000 pressure cycles from 0% to 50%FS	+/-0.1%FS/y	+/-0.2%FS/y
Realtime clock crystal accuracy	32,768Hz +/- 10ppm		
Wetted Material	316 Stainless Steel, Delrin® & Rubber Buna (PFAS free Wetted Materials)		
O-Rings	Rubber Buna Primary Seals, Viton Secondary Seals.		
Transducer Material	316 Stainless Steel, Piezoresistive Silicon		
Length	145mm		
Diameter	22mm		
Weight	170g		
Logging Modes	Linear, and predetermined Log		
Launch modes	Immediate and future start/stop		
Environmental Rating	IP68		
Certification	CE		
Communication Interfaces	USB via Heron Com-Cable		
Programing	Desktop Application (Windows 10 x86)		
Logging Intervals	1 second to 255 hours		
Supported Pressure Units	Meters, Feet		
Supported Temperature Units	Celsius, Fahrenheit		

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