



NORTEK QUICK GUIDE

# Vector velocimeter



This Quick Guide provides you with the basic information you need to get the instrument up and running as quickly as possible. If you are familiar with the Nortek instruments, this guide may be all you need. If you are new to our instruments and software, you should check out the Nortek [Comprehensive Manual](#), which includes principles of operation, mounting guidelines, troubleshooting, service manual and simple system integration. You will also find a lot of useful information on the [Nortek Support site](#).

### Preparation

- Connect the battery/power cable.
- Install the software located on the USB memory stick. Once the installation is complete, launch the application related to your instrument.
- Run a Functional Test, described in the **Service Manual** chapter in the [Comprehensive Manual](#).
- Set the Pressure Offset: **On-line > Set Pressure Offset**.
- If there are magnetic materials in proximity to the instrument when mounted, a calibration of the compass is necessary: **On-line > Compass Calibration**.
- Erase the recorder in advance of every deployment.

### Deployment Planning

- Select **Deployment Planning**.
- The activated dialog contains all parameters required to specify the operation of the instrument. A description of each parameter can be found in the application help, accessible from the Deployment Planning dialog box. One parameter that requires extra attention is the **Nominal velocity range**, which is a simple way of describing the maximum unambiguous velocity the instrument is able to measure. The velocity range should be set as low as possible, to minimize measurement uncertainty and noise. If the actual values measured exceed the range, your data will be impaired and may become unusable. See the [Comprehensive Manual \(Velocimeters\)](#) for more information.
- The Deployment Planning frame on the right-hand side of the dialog displays performance parameters that are automatically updated as you change the settings. Use the Standard configuration to plan your deployment, unless you have a very good reason to move to Advanced. The latter increases the flexibility but so does the risk of making mistakes. Note that the **Use Advanced Settings** box (Standard tab) must be checked for the advanced settings to be effective.
- When finished, press **Update** to accept the changes. By using the Open/Save commands in the File menu (or the corresponding toolbar buttons) the deployment parameters can be saved to file at any given time and re-loaded when it is time to deploy the instrument.

### Start Recorder Deployment

- Establish communication with the instrument.
- Select **Start Recorder Deployment**, either from the pull-down menu or from the toolbar.
- Specify the date and time to start the data recording.
- In the Name field, enter up to six characters of text to identify the data file stored in the recorder.
- In the File Comment box, enter up to 180 characters of text that will be included in the data file for documenting the data set.
- After pressing **OK**, the Set Clock dialog box is displayed. We recommend setting the clock to PC time. The time reference is especially important to ensure proper synchronization between the instrument and other datasets collected independently. Time spent on setting the time properly before a deployment can save a lot of time in post processing and analysis.

### Please check that all expected items are included in the shipment:

- The instrument
- External power/signal cable
- NORTEK equipment storage box/toolkit
- USB to serial converter
- AC/DC voltage transformer
- Power cable (European or American)
- Software on USB memory stick
- Final test check list
- Packing list

### Install the Nortek software

The instrument's software is located on the attached memory stick.

Please check the web regularly for updates on both software and firmware.

- Press **Yes** to continue. A confirmation dialog will display the deployment parameters and allow you to verify that the set-up is what you intended.
- Press **Confirm** to send the configuration to the instrument. The instrument will verify that the deployment has started. The configuration information from the deployment sequence is saved in a log file that has the same name as the deployment..

### Stop Recorder Deployment

- Select **Stop Recorder Deployment**. When data acquisition has stopped a dialog will display the current instrument and PC clock time.

### Data Retrieval

- Select **Recorder Data Retrieval**.
- The recorder overview dialog will show a list of all files currently stored in the recorder, including the time of the first measurement and the size for each file.
- Select a file in the list by clicking on the filename. Press **Retrieve** to specify the name and disk location of the file.

Tip! Check the retrieved data before deploying the instrument for the second time. If something is wrong with the instrument, the configuration or the deployment, this will be detected and the possibility of making the same mistake twice is avoided.

### Data Conversion

- To convert binary data files retrieved from the recorder to a readable ASCII format, select **Data Conversion**.
- Add files to the Files to convert list by using the **Add file...** file selection dialog. Select the file to convert in the list and press the blue arrow. Specify the location for the converted files in the Save in folder field. An optional prefix or suffix that will be added to the recorder filename may be specified. Select from the View files drop-down list to open the converted (ASCII) files in e.g. Notepad.

### On-line Data Collection

- Select **Start Data Collection** from the On-line menu (or press the toolbar button) to start data acquisition. The real time display shows velocity data and sensor data as it is collected.
- To capture the data that comes in over the serial port to disk select **Disk Recording...** from the On-line menu and define the name of a file (without extension). Once this disk file is defined, the Start Disk Recording and Stop Disk Recording menu items and toolbar buttons will be enabled.

### Mounting

Proper mounting of the instrument is crucial for successful collection of data. Please mount the instrument in accordance with the **Mounting Guidelines** in the [Comprehensive Manual](#).

### Cables

Our instruments are mostly shipped with RS232 communication. RS422 is used for cables longer than 50 m. The wiring is shown in the tables below. The output can either be in ASCII, in fixed NMEA format, or binary format. Communication baud rate: 300-115200 (user setting), recorder download baud rate: 600/1200 kBaud. Ensure that the connectors and dummy plugs are lubricated with dielectric silicone. We recommend 3M silicone spray. Note that the silicone grease included in the shipment should be used on the O-rings only.

### Analog Input (default for most instruments)

The instrument can read two analog inputs at the same time. The input range is 0-5V, corresponding to 0-65535 counts in the data file.

### Basic principles

Pulse-coherent instruments utilize a pair of acoustic pulses with a known time lag to determine a Doppler induced phase shift. This measured phase shift is converted to velocity by scaling with the speed of sound in water. The Vector uses separate transducers to transmit and receive the acoustic beams (bistatic system).



### Measuring waves

The Vector can measure waves using the PUV method. The pressure measurement provides a means of estimating all the nondirectional wave parameters, while the combined P, U, and V measurements allow for estimating the directional wave parameters. These data need to be post processed.

### Data analysis

The software supplied has been designed to provide you with the ability to set the instrument up for deployment, upgrade the firmware, download acquired data and do a quality assurance of them. The data can be converted to ASCII format that may be imported into various post processing programs.

## Power

- DC Input: 9-15 VDC
- Battery DC-input, nominal voltage: 13.5 V

## System Integrator Manual

For more information on how to control a Nortek product with a non-PC controller, please take a look at the [System Integrator Manual](#).

## Troubleshooting

As most problems are caused by simple mistakes, please initially check if

- you have forgotten to power the system
- the connector has fallen out of the computer
- you are using the wrong serial port

You may find that there is a lot of noise in the velocity data. This may be caused by


- not enough particles in the water
- the velocity range set too high
- the sampling volume located beyond the bottom
- reflection and reverberation conditions at the bottom
- probe malfunction


Test the probe with the Probe Check feature to identify issues.

## Nortek online



At [our website](#) you will find technical support, user manuals, and the latest software and firmware. General information, technical notes, and user experience can also be found here.

Email: [inquiry@nortekgroup.com](mailto:inquiry@nortekgroup.com) for general inquiries or [support@nortekgroup.com](mailto:support@nortekgroup.com) for technical support.

Underwater Connector				Termination	
Pin #	Wire Color	Purpose		Pins	
3	Black	RS232 Tx	Twisted Pair	2	
4	White	RS232 Rx		3	
5	Black	RS232 Gnd	Twisted Pair	5	
6	White/purple	Power Output			
7	Black	Analogue Ch. 2	Twisted Pair		
8	White/orange	Analogue Ch. 1			
1	Black	Power Gnd	Twisted Pair		
2	White	Power +			
Screen terminated at pin 1 in underwater connector, unterminated at PC side.					
Ref: N2100-002A					

Underwater Connector				Termination	
Pin #	Wire Color	Purpose		Pins	
3	Black	RS422 Tx +	Twisted Pair	7	
4	White	RS422 Tx -		2	
7	Black	RS422 Rx -	Twisted Pair	8	
8	White/orange	RS422 Rx +		3	
5	Black	Sync. Out	Twisted Pair		
6	White/purple	Sync. In.			
1	Black	Power Gnd	Twisted Pair		
2	White	Power +			
Screen terminated at pin 1 in underwater connector, unterminated at PC side.					
Ref: N2100-108					

**Wiring of RS232 (upper) and RS422 (lower) cables.**

Underwater Connector				Termination		
Pin #	Wire Color	Purpose		Pins		
3	Black	RS232 Tx	Twisted Pair	2		
4	White	RS232 Rx		3		
5	Black	RS232 Gnd	Twisted Pair	5		
6	White/purple	Analog Z*				
7	Black	Analog X	Twisted Pair			Red wire
8	White/orange	Analog Y			Green wire	
					Yellow wire	
1	Black	Power Gnd	Twisted Pair	Black wire		
2	White	Power +				White wire
Screen	Bare	Ground	3 bare wires for grounds, connected internally to power ground			
Ref: N2100-004						

**Wiring of RS232 cable with option for analog inputs. \*Optional version outputs pressure instead of Z velocity.**