Detailed technical specifications

MEASUREMENT PERFORMANCES	
Doppler frequency computation method	based on a correlation algorithm -sampling method: pulse to pulse coherent Doppler -estimation method: pulse-pair
Additional tools	phase coding, static echo filter (filters stationary echoes caused by a wall for example)
PROFILE	
Cell sampling range	0,005 to 4 m
Number of cells (sometimes referred as gates or channels)	2 to 200
longitudinal cell size	0.3 mm min
Inter-cell distance resolution	3,5 mm to 10 cm (0,3 mm optional)
Position of the first cell	minimum of 3 mm (warning: blind zone)
lateral cell size	beam width: 2° to 5° (depending on the transducer and on the emitting frequency)
VELOCITY	
Velocity Range	[-4 to 4] m/s (under Nyquist condition)
Velocity scale	movable origin between - velocity range and 0 m/s
Velocity accuracy	0,2 to 1%
Velocity resolution	0.25 ppm of the velocity range
ECHO (optional)	
raw echo resolution	1.22µV (at maximum gain)
EMISSION	
Number of emission periods	Minimum of one emission period over beam axis, Minimum of 0.39 mm (given in water). Any integer number of cycles.
Emission per profile	from 2 to 128 step of 1
Pulse repetition frequency	29 Hz to 10 kHz, central frequency dependent

Frequency range	0.5 to 7.5MHz (allowing particle size spectroscopy)
Emitting power	30 and 60 V (equivalent to 18 and 72 W)
ACQUISITION	
Acquisition mode	sequential per bloc. During a bloc measurement, constant jitter of a few µs between each instantaneous profile. In bistatic mode: simultaneous acquisition on both channels.
Switching time between configurations	800ms from one configuration to the other
Acquisition time per profile	minimum: 10ms (100Hz)
external trigger	by external pulse (TTL 0-5V)
Amplification (TGC)	amplification range from 20 to 68dB. -uniform -slope mode: exponential amplification -automatic computation
sensitivity	> -107 dBm
Temperature	(0-60°C with step of 1°C)

DATA MANAGEMENT	
Communication	Ethernet, HTTP and TCP-IP protocols
Internal data logger	3 Go (more than 20 000 profiles)
File format	ASCII CSV (compatible with Excel, Matlab ...) for average data and RAW for other data
Configuration parameters	5 configurations with description can be saved. (12 optional) Each configuration contains the following parameters: channel (2 channels in bistatic), emission frequency, reception mode, pulse repetition frequency, sample number, supposed minimal velocity, first cell position, inter-cell distance, number of cells, cell size, phase coding option, static echo filter option, number of profiles per bloc, amplification gain parameters. Some information is common to all the configurations of one acquisition: sound speed, operator, comments, transducers Doppler angle and absolute position.
Displayed data	Mean velocity profile, instantaneous velocity profile, mean echo profile, signal quality indicator (green or red) giving the distance to the transducer. Or average of each of the profiles given the time.
Cursor	When click on the graph: Display of the values of mean velocity, instantaneous velocity, echo amplitude, cell number, distance to the transducer of the nearest cell position
record mode	start triggered by the user: -Interval between two measurements: Fastest or fixed (day, hour, minutes, seconds) -record time: manual (user stops by click on stop button) or given duration (day, hour, minutes, seconds) or given number of records (blocs)
recordable data	mean velocity profile, mean echo profile, signal quality profile, turbidity profile, Doppler signal raw samples (IQ) (optional), instantaneous (real-time) profiles raw data (optional)
display of record data	in post-processing (Ubertone offers an online post-processing tool to display and process recorded data
Velocity	Velocity profile data (relative to acoustic beam directions) per beam and cell
Echo Amplitude	Backscattered echo RMS amplitude per beam and cell
Turbidity	Acoustic turbidity data per beam and cell
Data Quality	Profile data quality indicator per beam and cell

ENVIRONMENT	
Host Operating system	The device is an autonomous system, which means it can continue to measure and record even when the computer is not connected to it anymore. The interface is a web interface, so all operating systems can be used (incl. iOS, Windows, Android, Linux, …)
Number of transducer connectors	-4 BNC connectors: 2 for transducers in emission/reception and 2 for transducers in reception (bistatic option) -8 BNC connectors (optional) for transducers in emission/reception
Temperature	BNC connector for PT100 probe
External trigger input	optional (TTL 0-5V)
Operating conditions	Temperature: 0 to 60°C, storage: -40 to 85°C Splash-water proof
Power input	110-230V AC or 12V DC
Power consumption	Maximum 12 VA
Dimensions	5.5 x 11.3 x 38.5 cm
Weight	1,45 kg
Cable	15 m typical (up to 70 m upon request)
Transport packing	sturdy flight-case (optional)