

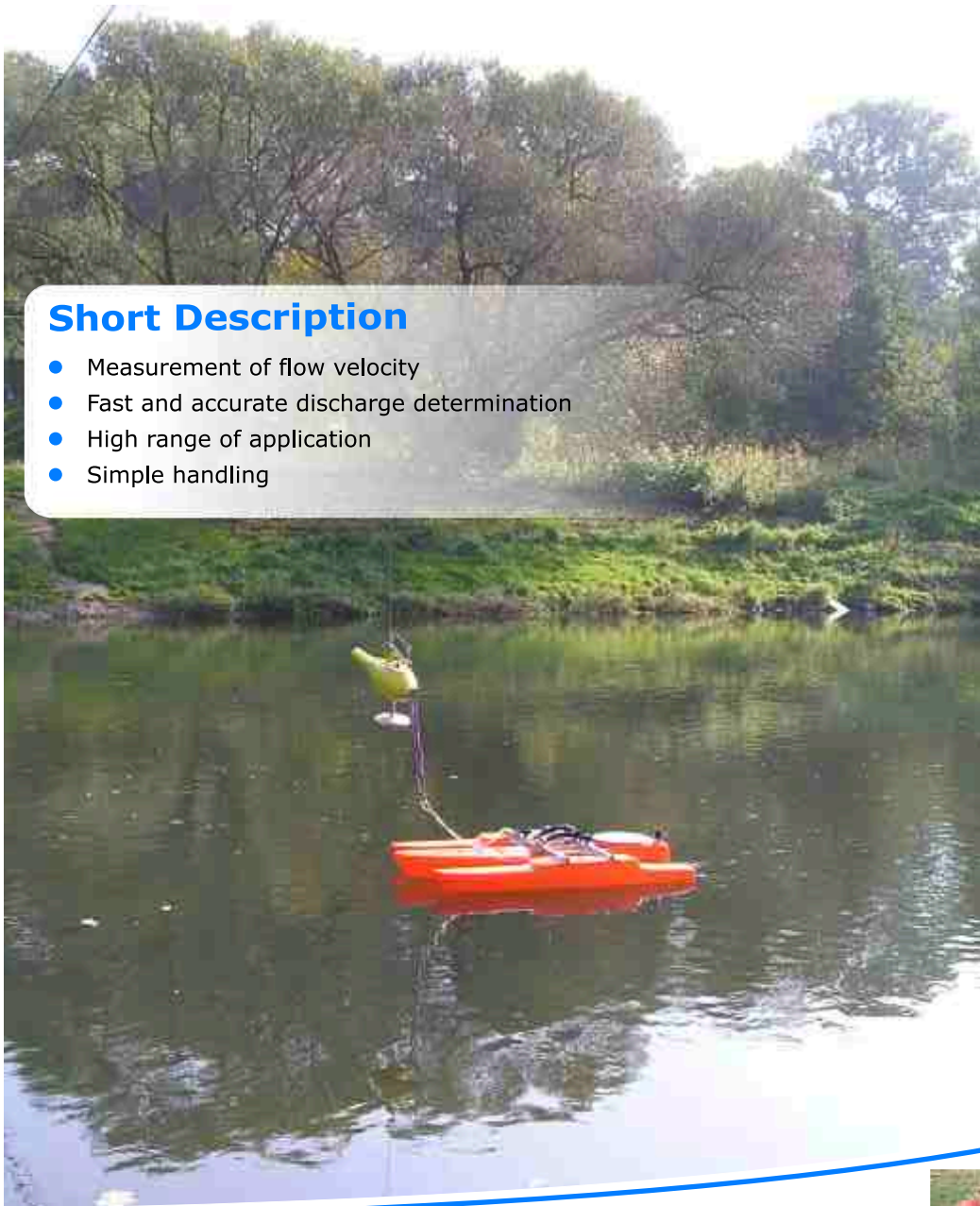


Mobile ADCP-Systems

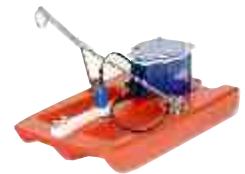
Velocity and discharge measurement in waterbodies

Short Description

- Measurement of flow velocity
- Fast and accurate discharge determination
- High range of application
- Simple handling



Rio Grande
with Riverboat



StreamPro



RiverRay



Workhorse Rio Grande
on boat



Measurement with Workhorse Rio
Grande and Riverboat



Measurement on rubber boat



Preparation of
StreamPro



StreamPro

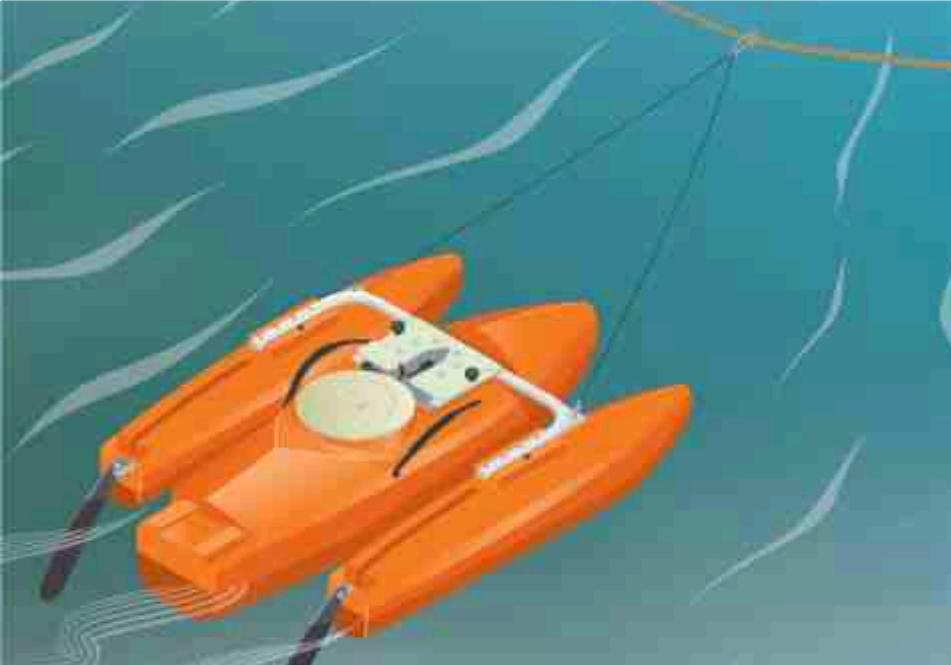


RiverRay

Automatic measuring system for velocity and discharge in rivers

The **RiverRay ADCP** (Acoustic Doppler Current Profiler) is a state-of-the-art, comfortable discharge measurement device installed in a float with less disturbances. The flat-surface, phased array transducer contains the latest measuring technology.

Automatic adaptive sampling continuously optimizes your discharge measurement from bank to bank, thus ensuring the highest quality data without your intervention. RiverRay can be used in low water and during floods to make accurate discharge measurements.



RiverRay Highlights

- Easy operation due to automatic adjustment of cells and measuring modes
- Flat-surface, phased array transducer
- Reduced size and weight ADCP sensor with low flow disturbance
- New improved floating body
- Wireless data transmission via Bluetooth
- Extendable with (D)GPS
- Large measuring range allows measurements in high and low water levels with one system
- Windows-based data collection software with display of all results

Technical Data

ADCP Sensor

Number of cells:	automatic, 25 typical, 200 maximum
Cell size:	automatic, 10 - 80cm
Min. depth:	0.6m
Max. depth:	40m
Bottom Tracking:	70m
Accuracy:	±0.25cm/s or ±0.25% of velocity (water and boat)
Resolution:	0.1cm/s
Measurement range:	±5m/s
Configuration:	phased array
Frequency:	600kHz
Geometry:	4 beams
Angle of beam:	30°



Integrated sensors

Temperature	
Measurement range:	-5°C to 45°C
Accuracy:	±0.4°C
Resolution:	0.01°C
Tilt	
Measurement range:	±15°
Accuracy:	±0.5°
Resolution:	0.01°
Compass	
Accuracy:	±2°
Resolution:	0.01°
Max. tilt:	±15°



System components

- ADCP Sensor
- Data collection software WinRiver II
- Float
- Bluetooth interface

Power

10.5 - 18V_{DC}

Physical properties

ADCP Sensor

Weight: 4kg

Dimensions: Ø 16.5cm x
17.5cm length

Float

Weight: 10kg

Dimensions: 120cm x 80 cm x
18 cm (LxWxD)

Options

- Section-by-Section module
- Communication via radio modem

StreamPro

Velocity and discharge measurement in shallow streams

The **StreamPro ADCP** (Acoustic Doppler Current Profiler) represents a revolutionary advancement in velocity and discharge measurement. Now you can accurately measure discharge in shallow streams in a matter of just minutes.

StreamPro can be tethered to be pulled from a bridge or a cable way. It is easy to handle and therefore fast applicable. The simple and highly intuitive user interface of software StreamPro has been designed to ensure proper operation.

StreamPro Highlights

- Measurements in streams from 20cm depth
- Small transducer head (Ø3.5cm), for minimal flow disturbance
- Low power consumption (1 day of operation on 8 mono cells 1.5V)
- Minimum cell size 2cm
- Communication via Bluetooth
- Intuitive user interface of software StreamPro
- Analysis and postprocessing of data with software WinRiver II



Technical Data

System Components

- small transducer head
- electronics case
- float
- data collection software StreamPro and WinRiver II
- bluetooth wireless
- SEBA-HDA

Power

10 to 13.5V_{dc} (8 x 1.5V mono cells or rechargeable NiMH batteries) for 8 - 12 hour operation

Physical Properties

Weight: 5kg incl. electronic, sensor, boat and batteries

Dimensions:

electronic housing:
15cm x 20cm x 10cm
sensor:
Ø 3.5cm x 15cm length
boat:
44cm x 70cm x 11cm (WxLxD)

Options

- Max. measuring depth extended to 6m (Bottom Tracking to 7m)
- integrated Compass (Pitch and Roll)
- Section-by-Section module

ADCP Sensors

Number of cells: 20 (30°)
Cell size: 2-10cm (2-20cm*)
Min. depth: 0.2m
Max. depth: 2m (6m*)
Bottom Tracking: 4m (7m*)
Accuracy: ±1.0% ±0.2cm/s
Resolution: 0.1cm/s
Measurement range: ±2m/s
(±3m/s with Riverboat SP)

Frequency: 2.0 MHz
Geometry: 4 beams
Angle of beam: 20°
Beam width: 3°
Material: Polyurethane
* with extended measurement range



Integrated Sensor

Temperature
measurement range: -4°C bis 40°C
accuracy: ±0.5°C
resolution: 0.01°C

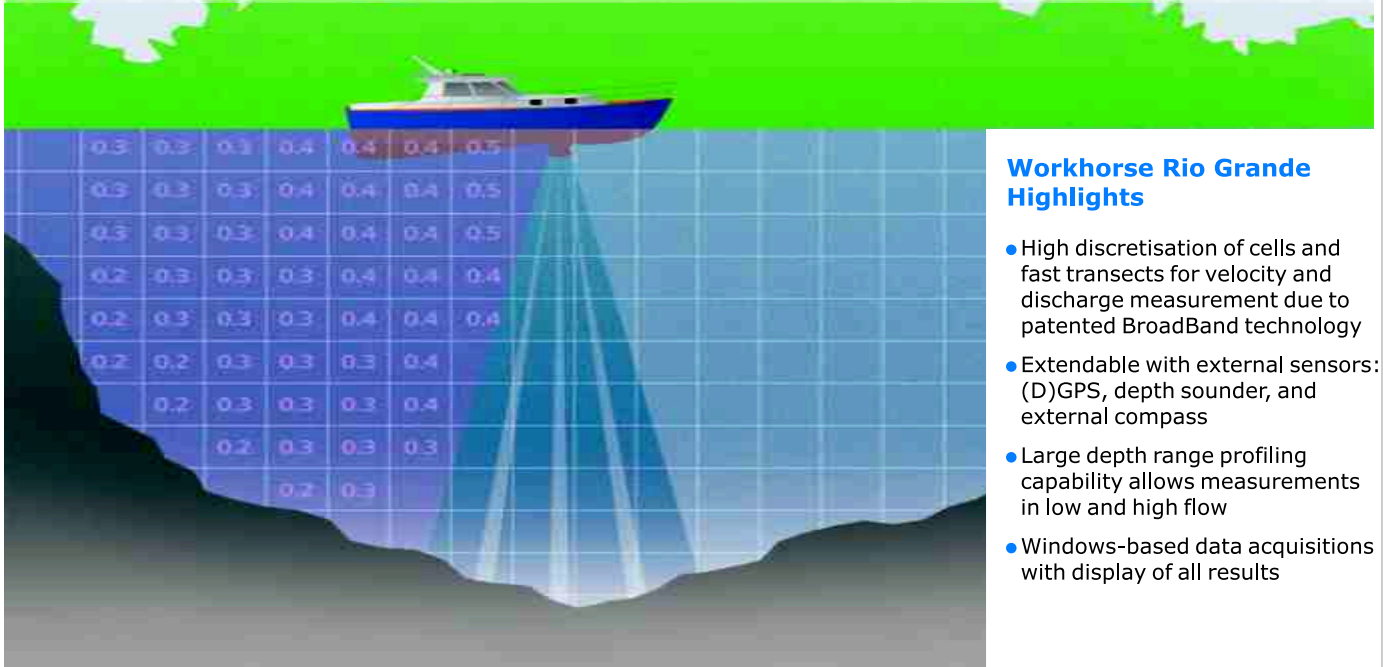


Workhorse Rio Grande

Versatile velocity and discharge measurement system for rivers

The **Workhorse Rio Grande ADCP** (Acoustic Doppler Current Profiler) is an accurate and comfortable discharge measurement system. It can be mounted on a boat or used with a float (Riverboat, Q-Boat). The results are fast and accurate discharge measurements.

The Workhorse Rio Grande measurement system can be used for a wide range of river conditions, from shallow streams to rushing rivers as well as tidal estuaries.



Workhorse Rio Grande Highlights

- High discretisation of cells and fast transects for velocity and discharge measurement due to patented BroadBand technology
- Extendable with external sensors: (D)GPS, depth sounder, and external compass
- Large depth range profiling capability allows measurements in low and high flow
- Windows-based data acquisitions with display of all results

Technical data

ADCP Sensors

Number of cells* :	128/255
1200kHz system	
Cell size* :	0.05-2.0m
Min. depth* :	0.6-4.8m
Max. Depth* :	4-26m
600kHz system	
Cell size* :	0.1-4.0m
Min. depth* :	0.7-9.2m
Max. depth* :	8-100m
Accuracy:	±0.25% of velocity (water and boat) or ±0.25cm/s
Resolution:	0.1cm/s
Measurement range:	±5m/s
Geometry:	4 beams
Angle of beam:	20°

*depending on measurement mode

Integrated Sensors

Temperature	
Measurement range:	-5°C to 45°C
Accuracy:	±0.4°C
Resolution:	0.01°C
Tilt	
Measurement range:	±15°
Accuracy:	±0.5°
Resolution:	0.01°
Compass	
Accuracy:	±2°
Resolution:	0.01°
Max. tilt:	±15°



System components

- ADCP sensor
- data collection software WinRiver II
- float (optional)

Power

10.5 - 18V_{DC}

Physical Properties

ADCP Sensor

Weight: 7kg

Dimensions: Ø 22.8cm x 20.14cm length

Riverboat

Weight: 7kg

Dimensions: 121cm x 81cm (LxW)

Options

- Bottom Mode 7: bottom tracking for shallow streams from 50cm depth
- Water Mode 12: for flow velocities >2m/s
- Section-by-Section module
- communication via radio modem
- remote controlled Q-Boat
- mounting fixture for rubber or motor boat

Comparison of mobile ADCP systems

RiverRay, StreamPro and Rio Grande



RiverRay

Number of cells	200
Cell size	automatic, 10 - 80cm
Min. depth	0.6m
Max. depth	40m
Bottom Tracking	70m
Accuracy	±0.25cm/s or ±0.25%
Resolution	0.1cm/s
Measurement range	±5m/s
Frequency	600kHz
Geometry	4 beams
Angle of beams	30°
Communication	Cable, Bluetooth, optional radio modem
Software	WinRiver II
Float	inclusive, optional Q-Boat 1800
Expansions	Section-by-Section
Options	(D)GPS



StreamPro

Number of cells	20 (30 ¹)
Cell size	2 - 10cm (2 - 20cm ¹)
Min. depth	0.2m
Max. depth	2m (6m ¹)
Bottom Tracking	4m (7m ¹)
Accuracy	±0.2cm/s or ±1.0%
Resolution	0.1cm/s
Measurement range	±2m/s (±3m/s with RiverboatSP)
Frequency	2000kHz
Geometry	4 beams
Angle of beams	20°
Communication	Bluetooth
Software	StreamPro, WinRiver II
Float	inclusive, optional RiverboatSP
Expansions	Section-by-Section extended measuring range integrated compass



Rio Grande

Number of cells	128 / 255 ²
Cell size	0.05 - 2.0m ² / 0.1 - 4.0m ²
Min. depth	0.6 - 4.8m ² / 0.7 - 9.2m ²
Max. depth	4 - 26m ² / 8 - 100m ²
Bottom Tracking	30m / 100m
Accuracy	±0.25cm/s or ±0.25%
Resolution	0.1cm/s
Measurement range	±5m/s
Frequency	1200kHz / 600kHz
Geometry	4 beams
Angle of beams	20°
Communication	Cable, optional radio modem
Software	WinRiver II
Float	Riverboat, Q-Boat 1800, mounting fixture for rubber or motor boat
Expansions	Section-by-Section Water Mode 12 Bottom Mode 7
Options	(D)GPS, depths sounder, external compass

¹with extended measurement range
²depending on measurement mode



(D)GPS - Differential Global Positioning System

Recording of cross-section coordinates in rivers

The **(D)GPS upgrade** is possible for Rio Grande with Riverboat, for RiverRay and Q-Boat 1800. In case of a moving bed it is recommendable to use (D)GPS instead of the Section-by-Section module.

Furthermore the (D)GPS equipment is mandatory for recording of cross-section coordinates, e.g. for hydraulic modelling. The accuracy is highly dependant on the quality of satellite reception and the correction signal.



Technical data

- Minimum reception of 4 satellite signals for determination of position
- Output format NMEA
- Data transfer to software WinRiver II

Accuracy

- GPS meter-accuracy
- With correction data (DGPS) submeter-accuracy
- RTK (Real Time Kinematic) mode centimeter-accuracy

Differential correction data

- Second GPS system at shore as reference station
- Geostationary satellites (EGNOS, WAAS, OMNISTAR)
- Beacon stations
- Possible costs for correction signal

Power

10.5 - 28 V_{DC}

Physical properties

Receiver

Weight: 1.3 kg

Dimensions: 24x12x5 cm (LxWxH)

High-Speed Riverboat

Tethered Boat for extreme conditions

With the new high-speed **Riverboat** accurate discharge measurements can be effected even under most difficult conditions; the streamlined trimaran cuts through surface waves, strongly resists overturning and maintains the instrument orientation in high flows. For measuring sites where tethered boat measurements have been impossible, the High-Speed Riverboat is the solution.



Technical features

- suitable for Rio Grande and RiverRay
- typical operation at velocities of 3-5 m/s
- suitable up to a max.velocity of 6,1m/s
- floating body made of highly resilient, UV-resistant ABS material
- retractable fins
- crossbar made of anodized aluminium

Physical properties

- Weight: 13,6 kg
- Dimensions: 152,2 cm x 122 cm (length x width)

RiverboatSP

Large float for small StreamPro sensor

Technical data

- Operation at flow velocities up to 3m/s
- Floating body made of polyethylene
- Cross bar made of anodized aluminium
- Large fins for high stability

Physical properties

Dimensions: 114cm x 81cm (LxW)

Options

- Soft-sided storage bag for transport

RiverboatSP is used with the StreamPro sensor. In addition to the standard floating body, the large float RiverboatSP is the ideal extension for determination of velocity and discharge measurements with StreamPro at high flow velocities. The conversion of StreamPro sensor and its electronic enclosure from the standard floating body to the RiverboatSP is performed easily with a few actions.



Q-Boat 1800

Remote-controlled velocity and discharge measurement

Technical data

- For operation with Rio Grande or RiverRay
- Two high-performance outboard engines
- Driving speed max. 5m/s
- Range of remote control 500m
- Continuous battery voltage monitoring and telemetry to the remote control unit
- Robust, insubmersible, plane, V-shaped hull
- UV-resistant synthetic material
- Communication via radio modem

Power supply

NiMH rechargeable batteries
Operation time:
- 40 minutes at 4m/s
- 240 minutes at 1m/s

Physical properties

Weight: 25kg
Weight during operation: 40kg
Dimensions: 180cm x 89cm(LxW)

Options

- (D)GPS upgrade
- External depth sounder
- On-board camera

Q-Boat 1800 is a remote-controlled float for **Rio Grande** or **RiverRay**. Now, velocity and discharge measurements are even possible at impassable measuring sites. The Q-Boat 1800 allows a safe and unmanned measurement in case of floods. The two outboard engines and the V-shaped hull ensure an easy control even in turbulent waters.



WinRiver II Software

Registration and analysis of discharge measurements



The software **WinRiver II** is used to record and analyse velocity and discharge measurements of mobile ADCP systems.

The configuration of the measurement system can be done by running the "Measurement Wizard". Site-specific settings and different modes can be chosen to adapt the measurement device to different river conditions.

After finishing the measurement, the playback menu offers the possibility to correct the measurement settings and to reanalyse the measurement. For the analysis itself, several tables and graphics are available.

The software **WinRiver II** can also be used for the operation with StreamPro in combination with a long-range SEBA bluetooth module.

StreamPro Software

Registration and analysis of discharge measurements with StreamPro

In combination with the SEBA bluetooth module, Software **StreamPro** can be used to record and compare measurements with StreamPro on your HDA (Hydrological Digital Assistant).

With the SEBA HDA as an easy-to-handle, lightweight and waterproof device, your mobile discharge measurement is sure to be an innovative experience. Our self-explanatory software StreamPro alleviates the measurement with your StreamPro. Tabulation allows a comparison and analysis of discharge measurements directly at site.

After finishing a measurement with software StreamPro, your data can be imported in WinRiver II easily and comfortably. Afterwards, the measurement can be managed and processed professionally as usual.

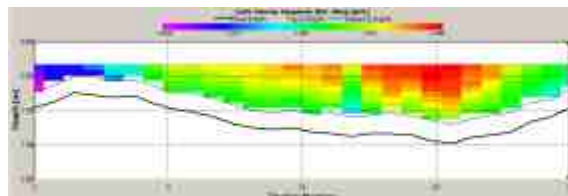


Section-by-Section Software

Registration and analysis of discharge measurements in verticals

The software **Section-by-Section** is used to record and analyse discharge measurements of mobile ADCP systems in verticals.

With Section-by-Section software, water velocity and depth data is actually acquired at a series of fixed locations across the measured body of water. With Section-by-Section, the specific verticals were analysed and the total discharge is determined. Because Section-by-Section is similar to conventional measurement methods, it's extremely easy to learn.



The right is reserved to change or amend the foregoing technical specification without prior notice.



SEBA Hydrometrie GmbH & Co. KG

Gewerbestr. 61a • 87600 Kaufbeuren • GERMANY

Tel.: +49 (0)8341 / 9648-0

Fax: +49 (0)8341 / 9648-48

E-Mail: info@seba.de

Internet: www.seba.de

represented by:

 **MONITOREASS**
PRODUCTOS Y SERVICIOS DE MONITOREO DE AGUAS
www.monitoreass.cl