



Multiple-Frequency River Q3 ADCPs

for River/Channel Flow and Sediment Discharge

RTI's Multi-Frequency **River Q3** ADCPs employ advanced 3rd generation RTI ADCP Technologies providing:

- Dual-Frequency Bottom Track, Current Profile, and Altitude measurements
 - Quad or Triple Target Strength measurements for Sediment Concentration and Grain Size estimation
- together providing measurement of calculation of both River Flow and Sediment Discharge. Four configurations are available.

FEATURES	APPLICATION BENEFITS
<p><i>Multi-Frequency ADCP with overlapping inclined Dual-Frequency 4-beam sets and Dual-Frequency vertical beams.</i></p> <div style="text-align: center;"> <p>MODEL: RS1 RS2 RS3 RS4 Slant beams: 1200/2400 600/2400 300/1200 300/1200 Vertical beams: 600 300/1200 600/2400 600/2400</p> <p>ADCP CONFIGURATIONS</p> </div>	<ul style="list-style-type: none"> ➤ Synchronized sequential long profiling range at lower frequencies, plus high spatial, velocity and temporal resolution measurements over short ranges at higher frequencies in a single ADCP. ➤ Multi frequency ADCP use in shallow and deep rivers. ➤ Accurate low frequency Bottom Track in high sediment “moving bottoms” conditions. ➤ Triple and Quad-Frequency beams enable sediment characterization.
<p><i>Dual-Frequency piston transducers (illustration of one beam set)</i></p> <div style="text-align: center;"> <p>High Frequency Beam Low Frequency Beam</p> </div>	<ul style="list-style-type: none"> ➤ Reduced Dual-Frequency transducer size. ➤ Overlapping beams provide improved sediment and velocity measurement and data quality control. ➤ Low frequency and high frequency transducers have identical beam widths and ensonify same volume underwater.
<p><i>Precision inter-frequency acoustic transmit and echo reception of Triple or Quad-Frequency beams</i></p>	<ul style="list-style-type: none"> ➤ Precise Multi-Frequency Target Strength measurement for characterization of sediment concentration and grain size.
<p><i>Real-Time automatic multi-mode optimization of multiple frequency, bin sizes, Multiple-Frequency pings, transmit levels, Broadband, Narrowband and pulse-to-pulse coherent modes.</i></p>	<ul style="list-style-type: none"> ➤ Automatic mode adaption to River and Channel depth, velocity and sediment conditions.
<p><u>DP-Pro Q software</u></p> <div style="text-align: center;"> </div>	<ul style="list-style-type: none"> ➤ Real time GPS integration, processing and display of velocity and sediment profiles, Discharge, navigation and data quality. ➤ Real time flow discharge and sediment transport calculation. ➤ Internal ADCP recording of all raw and processed echo data for post deployment review.
<p><i>Optional trimaran and autonomous USV with integrated radios and DGPS</i></p> <div style="text-align: center;"> </div>	<p>Trimaran 3</p> <ul style="list-style-type: none"> ➤ 3 Plastic Hulls and mounting hardware. ➤ Bluetooth Radio - range 100 m. ➤ Differential GNSS Receiver supports GPS, Galileo, GLONASS and BeiDou satellite systems. ➤ Boat includes Bluetooth wireless communication up to 1000 m wireless communication range. ➤ ADCP Mounting hardware for easy installation.

SPECIFICATIONS

ACOUSTIC CONFIGURATIONS	RS1			RS2				RS3*			RS4 *		
Frequency (kHz)	1200	2400	600	600	2400	300	1200	300	1200	600	300	1200	600
# Beams	4	4	1	4	4	1	1	4	4	1	4	4	1
Beam Angles	± 20°	± 20°	0°	± 20°	± 20°	0°	0°	± 20°	± 20°	0°	± 20°	± 20°	0°
2-Way Beamwidth	1.8°	2.2°	6.1°	2.2°	2.2°	6.3°	4.3°	2.9°	2.9°	6.1°	2.9°	2.9°	6.1°
CURRENT PROFILE													
Operation Mode	Narrow Band, Broadband, Pulse-Pulse, Auto, Manual												
Velocity Range	±20 m/s Max; ±5 m/s Typical												
Accuracy	±0.25% water velocity relative to ADCP												
Resolution	0.1 mm/s												
Number of cells	Up to 300												
Minimum and Maximum cell size	10 cm minimum to 16m maximum												
Data output rate	5 to 10 Hz for 300 Hz, 600 kHz, 1200 kHz, 2400 kHz (can be 30 Hz for shallow depth)												
MAXIMUM RANGE													
Broad Band Profiling Range (m)	17	5	40	60	5	70	10	65	15	40	65	15	40
Standard depth cell size (m)	1	0.5	2	2	0.5	4	1	4	1	2	4	1	2
Narrowband Single Ping Precision	20 cm/s @ standard depth cell size												
Broadband Single Ping Precision	3.5 cm/s @ standard depth cell size												
Long Term Accuracy	± 0.7 %, ± 2 mm/s												
ECHO INTENSITY PROFILE													
Amplitude Dynamic Range	80 dB												
Amplitude Accuracy	± 2 dB												
Altitude Accuracy	± 1 % (with uniform temperature and salinity)												
BOTTOM TRACKING													
Maximum Range (m)	25	10	60	90	10	105	20	120	25	60	120	25	60
Long Term Accuracy (standard)	± 1.0 %, ± 0.1 mm/s												
Single-Ping Precision	± 0.4 cm/s @ 3 m/s												
Maximum Bottom Track Speed	15 m/s												
Depth Measurement Accuracy	± 1.0 %												
Depth Measurement Resolution	3 mm for single ping												
SENSORS													
Compass	0 – 360 °; Accuracy - ± 1°/±0.01°												
Tilt(Accuracy/Resolution)	Roll ± 180° and Pitch ± 90° ± 0.2° ± 0.05°												
Water Temperature	-5 to 50°C ± 0.2°C												
Pressure	± 0.1% Full Scale												
INPUT POWER	10 - 24 VDC @ 3 amps max., Can also operate with Rechargeable Battery, 12vdc, 4AH with Charger, Typical 8 hour operation (depends on operating and environmental conditions)												
Data Communications	RS-232, RS485 or RS-422 serial @ 1,200 – 115,000 baud												
Optional Data Storage	Up to 512 GB												
I/O Cable Length	5 m and 25 m												
Operating/Storage Temp	-5 to 50°C/-30 to 70°C												
FLOATS	Three hulls (trimaran) made of Polyethylene Dimensions: Length 120 cm, Width 85 cm and Height 39 cm												

➤ **NOTE:** RS3 and RS4 have same transducers but different mechanical housings

MECHANICAL DETAILS

MODEL NUMBER	A DIAMETER	B THICKNESS	C DIAMETER	D HEIGHT	E DIAMETER	F HEIGHT	G HEIGHT
RS-1	5.0"/127	1.7"/ 43	5.0"/127	8.0"/203	4.9"/ 124	6.4"/162	1.2"/ 30
RS-2	7.0"/178	2.0"/ 51	5.0"/127	8.0"/203	4.9"/ 124	6.4"/162	1.2"/ 30
RS-3	8.9"/226	3.21"/81.5	5.0"/127	8.0"/203	4.9"/124	6.4"/162	1.2"/ 30
RS-4	8.9"/226	2.94"/74.7	7.95"/202	5.5"/138	7.1"/180	4.55"/116	0.5"/ 13

