



Product Description

AccuFlow-Q is a robust and portable flow pump system designed to generate realistic, accurate and repeatable physiological volume flow waveforms, including carotid, femoral, sine, triangle and constant flow waveforms. Combine the AccuFlow-Q with an appropriate tissue phantom and blood mimicking fluid, and the resulting flow system ensures easy, accurate, repeatable evaluation and validation of diagnostic ultrasound systems. The pump system is designed for evaluation of most common ultrasound techniques: fluid velocity measurements, volume flow measurements, sensitivity measurements at varying depths, maximum penetration, location and directional discrimination, as well as flow visualization.

AccuFlow-Q is a novel design that features a built-in reservoir and volumetric calibration device to ensure highly accurate measurements.

Product Features

AccuFlow-Q offers pre-programmed carotid, femoral, constant flow, triangle and sine waveforms.

Produces accurate physiological flow waveforms including those with reverse flow such as the femoral waveform.

Pulsatile flow range from 2 to 15 ml/s. Constant flow rate from 2 to 25 ml/s

Peak flow rate is easily selected in 0.1 ml/s increments.

Internal volumetric calibration enables verification of constant and pulsatile flow rates during a measurement.

For automated and more advanced studies the AccuFlow-Q can be controlled by a serial (RS-232) interface.

User-defined waveforms (maximum length of 200 points per waveform) can be permanently downloaded to the AccuFlow-Q and stored in FLASH memory. Select a user-defined ECG location.

A trigger output allows the user to check gated acquisition such as ECG-gated colour flow.

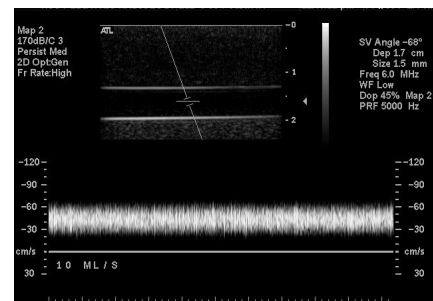
Incorporates a high-visibility front panel vacuum fluorescent display and backlit keypad.

Quick disconnect leak-free fluid input and output fittings.

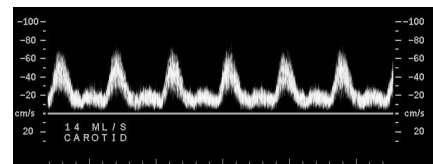


Perform acceptance testing and routine quality assurance measurements quickly and easily.

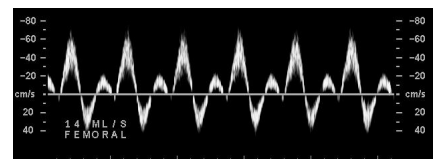
Sample Waveforms Generated by AccuFlow-Q



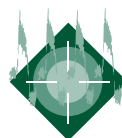
Pulsed Doppler spectra obtained using constant flow with a programmed flow rate of 10 ml/s. The stability of the output is obvious.



Pulsed Doppler spectra obtained using a carotid waveform with a programmed flow rate of 14 ml/s. Reproducibility of waveforms is excellent.



Pulsed Doppler spectra obtained using a femoral waveform with a programmed flow rate of 14 ml/s. Reverse flow components can be accurately simulated.





Computer Interface

- Can be operated over an RS-232 serial link
- Provides full control of the pump

Motor Controller

- Custom designed motor controller
- High performance micro stepping motor
- Provides maximum flexibility in waveform production
- Maximizes capabilities for advanced studies and research

Electrical Connectors

- Trigger output signal (BNC) updated synchronously with the waveform
- One RS-232 serial port (DB9) for computer control and waveform downloading
- 110 VAC 60 Hz 1 Amp
- Internal line filter

Fluid Connectors

- Quick disconnect fitting 1/4" inner diameter for IN, OUT and VENT ports.

Calibration

- *TrueFlow* integral volumetric flow calibration
- User can verify accuracy of any waveform at any time

Pump Dimensions

- Reservoir volume: 1 liter
- Weight: 13.2 kg, 29 lbs
- Size: length: 42 cm, width: 37 cm, height: 19 cm

Optional Blood Mimicking Fluid

Speed of sound (m/s)	1548 ± 5
Density (kg m ³)	1037 ± 2
Particle diameter (µm)	5
Hematocrit (% volume)	< 5
Viscosity (mPa s)	4.1 ± 0.1

Optional Tubing/Valve/Tubing Assembly

Shelley Medical Imaging Technologies can provide the tubing, connectors and valve required to connect the AccuFlow-Q Doppler Flow Pump System to our Doppler tissue flow phantoms, to commercially available Doppler tissue flow phantoms, or to Shelley's custom Doppler tissue flow phantoms.

Optional Doppler Tissue Flow Phantoms

Model U-245 Doppler Tissue Flow Phantom is made with a urethane tissue mimic and contains two vessels with known geometry. An 8 mm diameter horizontal vessel enables evaluation of velocity and flow measurements. Doppler sensitivity is assessed in a 4 mm diameter vessel on a 45° angle.

Model U-245 Tissue Mimicking Material Specifications

Tissue Mimicking Material: Urethane
 Speed of sound 1430 m/s ± 10 m/s at 20°C
 Attenuation coefficient 0.5 dB/cm/MHz
 ± 0.05 dB/cm/MHz @ 5 MHz

Tissue Phantom Dimensions

- Weight: 3.6 kg
- Size: length: 17 cm, width: 10 cm, height: 21.5 cm

Vessel Geometry

- 8 mm horizontal vessel 2 cm deep
- 4 mm vessel at 45° angle

Optional Tissue Mimicking Materials

Shelley Medical Imaging Technologies designs custom Doppler tissue flow phantoms using the following tissue mimicking materials:

Zerdine™

Speed of sound 1540 m/s ± 6 m/s at 22°C
 Attenuation coefficient 0.5 dB/cm/MHz or
 0.7 dB/cm/MHz

Agar

Speed of sound 1540 m/s ± 10 m/s at 22°C
 Attenuation coefficient 0.7 dB/cm/MHz @ 5 MHz

The AccuFlow-Q Doppler Flow Pump System is modular in design, so the AccuFlow-Q, Doppler flow tissue phantoms and blood mimicking fluid can be purchased and used independently. The AccuFlow-Q is shipped with a one year parts & labour warranty. The warranty period for Doppler tissue flow phantoms will vary depending on the tissue mimicking material selected.

