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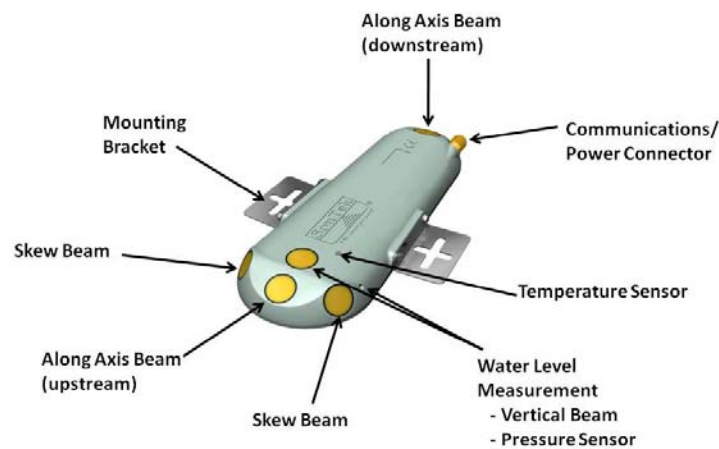
What does “IQ” stand for?

The IQ utilizes a number of intelligent algorithms to calculate flow based on the conditions in the field. In the hydrology field Q is often used to represent flow. Thus IQ stands for “Intelligent Flow”.

What does the SonTek IQ measure?

The SonTek IQ measures water level using a vertical beam and pressure sensor. The IQ measures channel velocity using four pulsed Doppler beams. These data are used to calculate flow rate and total volume. In addition, the SonTek-IQ measures water temperature which is used for speed of sound calculations. Below is a description of the IQ.

The IQ has five acoustic beams. When mounted properly on the bottom, one of these beams points straight up, this being the vertical beam. The upward-looking beam works in tandem with a pressure sensor to measure the water level. Additionally, there are four velocity profiling acoustic beams: 2 along axis beams that are 25° off of the vertical and 2 skew beams that are 60° of the vertical and 60° off the horizontal axis. The combination of the beams allows the IQ to measure the distribution of velocity horizontally and vertically thus providing a more accurate flow measurement. Water level and velocity information are then used to compute the flow, mean-velocity, and channel area.



Why does one version only go to 1.5 m while the other goes to 5m?

The SonTek IQ has two versions available. A lower priced SonTek IQ that can measure flow in open channels from 0.08 – 1.5 m. The higher priced SonTek IQ Plus has a measurement range from 0.08 – 5 m as well as advanced data processing and velocity profile outputs. The lower priced SonTek IQ is targeted for the irrigation market, while the SonTek IQ Plus targets larger channels with more complex flows, such as rivers and large canals.

What is the maximum channel width that I can use the SonTek IQ?

There is no maximum width limitation for the SonTek IQ and IQ Plus. In many instances accuracy requirements determined by the user may define where the instrument can be installed. The SonTek IQ and IQ Plus measure the velocity over a horizontal span approximately 3 times the water depth above the system – out to a maximum width of about 8 meters (25 feet). In other words, if the channel has a water depth of 1 meter where the IQ is installed, the SonTek IQ will measure a total horizontal span of about 3 meters. This aspect ratio is ideal for monitoring trapezoidal irrigation canals or natural channels with an evenly distributed bathymetry. If a channel is much wider than deep (i.e., aspect ratios greater than 6:1) it may be necessary to perform a velocity index calibration as the instrument may not sample enough of the water column to obtain a representative flow value. However this depends on site conditions – at some sites performance of the SonTek IQ may be sufficient without a velocity index. In the cases where a velocity index is required, the extended range of the SonTek IQ Plus and velocity indexing capabilities make it ideal for tough monitoring site. For shallow channels (up to 1.5 m) with an aspect ratio of 5:1 or less the SonTek IQ should provide users with reliable data without any indexing procedures, however in all cases the need for velocity index depends on user defined requirements for accuracy and site conditions.

What is the intended application?

This instrument is intended to be bottom-mounted, vertically up-looking through the water column for most applications. This could be in a canal, natural stream, or culvert. An important consideration in the design of the SonTek IQ was that it would be a device capable of calculating and outputting “discharge” values (flow rates). That is, in addition to measuring water velocity and level, it could also calculate and report the channel flow. This can be accomplished in several ways, including inputting the channel dimensions into the SonTek IQ and using theoretical equations for flow calculations, or inputting an empirically derived “index-velocity” relation.

Can the IQ replace the Argonaut - SW?

Yes. The SonTek IQ Plus is intended to replace the SW and do more. Using the 4 profiling beams the SonTek IQ will provide more accurate and reliable data than the SW. In addition the measurement range of the SonTek IQ Plus is 0.08 – 5.0 m getting users into even more shallow water (the SW requires 0.20 m of water). The pressure sensor and vertical beam

work in tandem to provide a robust water level solution. It is important to note that SW does have algorithms to measure flow in pipes, while the IQ does not.

Why five beams?

One beam is an acoustic vertical beam that is used to measure water level while the other four beams are used to profile velocity. Previously the SW has two beams, more or less the equivalent of the along axis beams of the SonTek IQ. However, the IQ has two skew beams that allow for additional velocity profiling – more velocity profiling means better flow accuracy

Why is the SonTek IQ grey?

Typical installations of the SonTek IQ will be in places where there is a fixed concrete section. Taking this into account, the color of the SonTek IQ is grey to match the color of concrete – thus making it less visible and less prone to vandalism.

Does the IQ have to be installed in the middle of the channel?

That depends a lot on the channel. When using Theoretical flow calculations, the IQ should be installed in the middle of the channel. However, in large channels where velocity indexing techniques will be applied, SonTek's experience indicates that for most accurate flow monitoring the instrument should be installed in the area of the channel that represents the highest velocities. For complex flows conditions, the SonTek IQ Plus allows for velocity indexing that in essence allows the user to calibrate the SonTek IQ to the complex flow at the site.

What happens if the channel cross-section changes?

Typically, the best and most accurate data are collected in clean cross-sections that are frequently maintained. The SonTek IQ directly measures velocity and water level. The water level is used to determine channel cross sectional area, thus if the cross sectional area changes the flow determined by the IQ will not be as accurate. If the channel cross section changes, SonTek recommends that users either clean the cross section or conduct a channel survey and update and reconfigure the IQ.

Can the IQ output velocity profile data?

Yes. The SonTek IQ Plus outputs profile data, while the SonTek IQ only outputs single dynamic cell average velocity data, the output is based on velocity profile information collected by the SonTek IQ.

Can the IQ record data and is there an internal battery?

The SonTek IQ has a 4 GB internal recorder; however, there is no internal battery power. 7-15 VDC power must be supplied externally.

What are the output formats?

The SonTek IQ supports RS-232, SDI-12 and Modbus data output. For a complete description of the output parameters, please contact SonTek directly. In addition, the SonTek Flow Display provides an interface to configure for 4-20mA outputs.

How long can the cable be?

The rule of thumb normally applied is up to 100 m (328 ft) for standard RS 232, SDI-12 or Modbus. Bear in mind the longer the cable the longer the download times.

Can I plug my Argonaut cable into it?

No. The Argonaut cable is not compatible with the SonTek IQ.

Can the IQ measure reversing flow?

Yes. When mounted properly with the along axis beams pointing upstream and downstream, the SonTek IQ will be able to detect when the flow changes directions. This is an important feature for quantifying flow delivered to customers when bi-directional flow can be experienced at the site.

Can I mount it as a side-looking device?

No. The SonTek IQ is not designed to be used as a side-looking device. For these applications, you might want to consider an Argonaut-SL.

Can I use the View Argonaut software with SonTek-IQ data files?

No. The SonTek-IQ data files can only be used with the IQ Software.

SonTek/YSI a division of YSI, founded in 1992 and advancing environmental science in over 100 countries, manufactures affordable, reliable acoustic Doppler instruments for water velocity measurement in oceans, rivers, lakes, harbors, estuaries, and laboratories. SonTek, and SonTek-IQ are trademarks of YSI Inc., Yellow Springs, OH, USA. The SonTek-IQ is made in the USA.