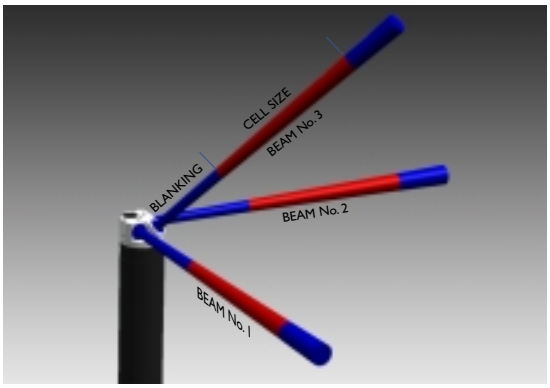
Aquadopp™
Head Configurations

Collecting data undisturbed by flow interference



A variety of sensor heads are available for the Aquadopp™. Each head is optimized for certain applications to ensure that you always can collect datawhich you really want to.

The Aquadopp™ measures the Doppler shift occurring when transmitting and receiving sound along two or more narrow acoustic beams. The Doppler shift is proportional to the velocity component along the beam. The data are combined, using simple geometry, to generate 2D (minimum 2 beams) or 3D velocity (minimum 3 beams).

Standard configuration

The standard Aquadopp™ sensor head is designed for mooring applications. The transducer orientation is optimized to give the best possible precision for the horizontal velocity. All three transducers are mounted on one side and the instrument should be mounted to assure that the beams are pointing into the undisturbed flow. In the case of a mooring line, this can be achieved by attaching a balancing fin to the Aquadopp™ or by using the "Aquafin" (see overleaf).

Sampling area, blanking and cell size

The sampling area is determined by the "blanking", "cell size", and beam geometry, as shown in the above Fig. The parameters "blanking" and "cell size" are user selectable in software, whereas the geometry is determined by the orientation of the acoustic beams. The tilt and the compass sensor in the Aquadopp™ work equally well whether it points up or down. Consequently, any head may be used up-looking just as well as down-looking.

Optional configurations

1. The right-angle sensor head is used when it is important to give the instrument a low profile to minimize drag. Typical examples are bottom frames, ROVs, and applications where the Aquadopp™ will be towed.

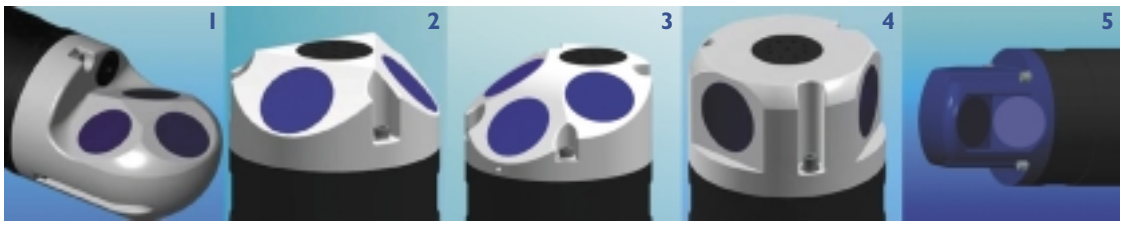
2. Symmetric sensor heads are designed to measure above or below the Aquadopp™. The most common application is Aquadopp™ units mounted on bottom frames. In addition to measuring above the frame at a programmable distance, the vertical extent of the sampling volume is more precisely defined with the symmetric design than with the standard "mooring" head.

3. The asymmetric Aquadopp™ head is used in situations where the sample area is best located above (or below) the instrument and out to the side. A good example is buoy mounted Aquadopp™ units, where the measurement area should be positioned both below the hull and away from the anchor chain.

4. The "hockey puck" transducer head has all three beams in the horizontal plane. The sensor head can only measure 2D velocity, but has the advantage that one of the beams can be eliminated in the calculation of the horizontal velocity. This head can be used when making measurement close to the surface or bottom.

5. The 2D side-looking Aquadopp™ head is used to measure 2D flow away from walls or boundaries. Typical applications include channel flow monitoring where the Aquadopp™ is mounted on the channel wall – protected from floating debris – and the measurements are made in the free flow away from the wall.

Should none of these configurations fit your application, note that other head configurations are available on request.



Numbers refer to corresponding numbers in sidebar text

Other configurations available on request

NORTEK AS

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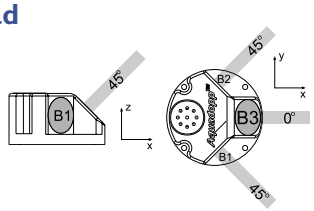
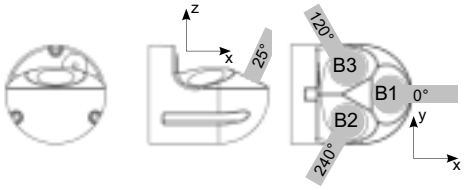
Head Configurations

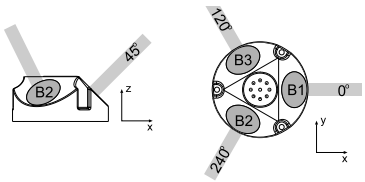
Standard head



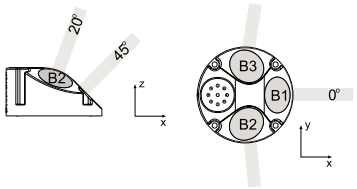
Right angle sensor head



Symmetric sensor head

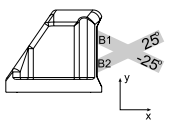


Asymmetric sensor head



"Hockey puck" sensor head

2D side-looking sensor head



Custom sensor design

The Aquadopp™ sensor head is made from a tough polyurethane plastic material suitable for molding. This allows us to design and construct new sensor heads with a lead time of four weeks or less. Contact Nortek or your local representative today if you have applications that may require a new sensor head design.

Sensor head nomenclature

The acoustic beams are defined by their unity vectors Bi in the reference coordinate system XYZ. The reference system remains constant, regardless of the sensor orientation. The conversion from beam velocity to XYZ velocity is given by the inverse matrix generated from the Bi vectors.

Other sensors

All heads have tilt and temperature sensors built in. Pressure sensor is standard for all heads except for the 2D side-looking head.

AquaFin Deployment fixture

The AquaFin is designed for mooring an Aquadopp Current Meter or a Current Profiler. It shackles into the mooring line and allows the Aquadopp to swivel freely so that its beams always look into undisturbed flow. Choose non-magnetic stainless steel or titanium for mooring loads of 1000, 2000 or 3000 lb (approximately 450, 900, and 1350 kg, respectively).

Dimensions are 414 mm × 684 mm (w × h). Fin alone is 306 mm wide. The AquaFin is manufactured by OceanScience.

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