

# Hydro-Wiper Operation Manual



## Overview

The Hydro-Wiper is a mechanical wiper system designed to be easily fitted to optical turbidity sensors. By wiping at regular intervals, the Hydro-Wiper keeps the optical window of the turbidity sensor clear of biofouling and deposits such as mud and algae. This reduces the necessity for costly site visits to manually clean the turbidity sensor, and prevents on-going data loss due to fouling.

There are 3 models of Hydro-Wiper, for 3 specific turbidity sensors;

<b>Hydro-Wiper model</b>	<b>Turbidity sensor</b>
Hydro-Wiper A	Seapoint turbidity sensor
Hydro-Wiper B	D&A OBS 3
Hydro-Wiper C	D&A OBS 3 +
Hydro-Wiper D	Aqualogger 200
Hydro-Wiper E	Aqualogger 210

The Hydro-Wiper consists of a wiper body that the turbidity sensor is attached to. The wiper body is connected to a wiper control housing by a cable. In addition to the batteries, the wiper control housing contains the control electronics, power switch, wipe interval select switch, and diagnostic LED.

As the Hydro-Wiper is fully self contained, incorporation into existing instrument installations is simple. The low power control electronics enable long deployments to be made, whilst the high precision wipe interval timer on-board the Hydro-Wipe insures minimal clock drift during long deployments.

## Installation

The turbidity sensor is mounted in the clamp at the front of the wiper. Ensure that the turbidity sensor is positioned so that the flat face of the optical window is looking directly away from the wiper, and that the brush covers the whole face when it sweeps passed.

The brush should lightly sweep across the whole surface of the optical window. If there is excessive brush pressure, battery life of the Hydro-Wiper will be reduced and damage to the optical surface of the turbidity sensor may occur.

If the brush pressure is insufficient, then contact between the brush and optical window will be lost in the centre of the window.

Brush pressure can be adjusted by loosening the nut at the end of the wiper arm, and rotating the wiper arm in the desired direction. The lock nut should be tightened after adjustment.

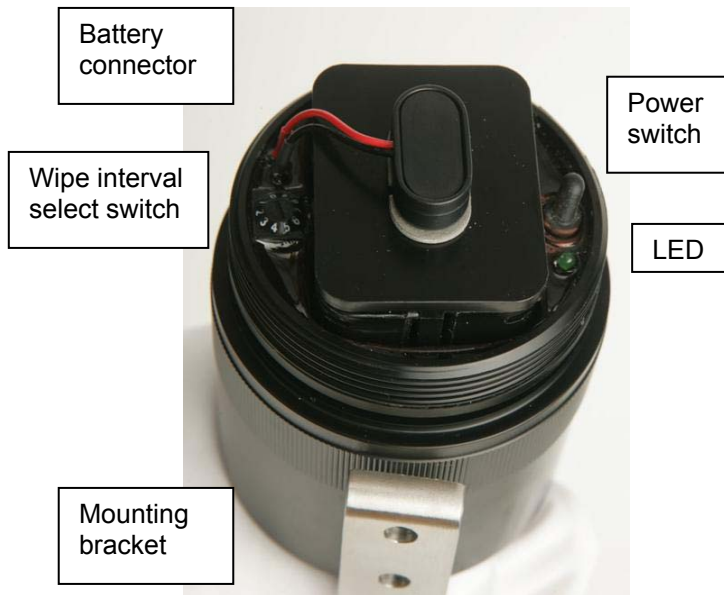
The wiper control housing should be mounted using the marine grade (A4,316) stainless steel bracket that is attached to the housing. Avoid attaching the bracket directly to a metal structure that is not marine grade stainless steel, as this can cause electrolysis and deterioration of the metal. Marine grade stainless steel bolts should be used for fixing.

Once the wiper control housing and wiper housing are mounted, secure the cable using cable ties to avoid possible snags and fouling with debris. The cable should not be free to constantly move with the water currents, as fatigue and eventual failure may result.

## Operation

To open the wiper control housing, unscrew the lid in an anti-clockwise direction. If the lid is tight, the lid shifting tool supplied with the Hydro-Wiper can be used. This tool fits into the groove in the top face of the cap, and allows greater leverage. The lid shifting tool should never be used to tighten the lid.

Inside the wiper control housing is the battery holder, wipe interval select switch, power switch, and diagnostic LED.



Battery pack

Power on - off switch

LED

Photo 1. Wiper control housing.

The wipe interval is set using the wipe interval select switch (refer to table 1). The wipe interval should be adjusted with the Hydro-Wiper

switched off. The optimal wipe interval will depend on environmental conditions at the field site. Generally a wipe interval of 3 hours should prove sufficient to keep the turbidity sensor clean in moderate fouling conditions.

Wipe interval select switch position	Wipe interval (minutes)
0	15
1	30
2	45
3	60
4	120
5	180
6	240
7	300
8	360
9	720

Table 1; Wipe interval select switch settings

Only good quality alkaline batteries should be used, such as Energizer or Duracell.

The Hydro-Wiper wipe interval timer starts 0.5 seconds after the power switch is turned on. The wipe interval is the time between the start of one wipe, and the start of the next wipe.

To avoid the wiper from affecting the turbidity sensor measurements, start the Hydro-Wiper out of sequence with the measurement schedule. For example, if the turbidity sensor measurements are scheduled every hour, then start the Hydro-Wiper at 30 minutes past the hour.

When the Hydro-Wiper is switched on, the LED will blink every 15 seconds. Under normal operation, the LED will blink once. If a fault condition exists, the LED will blink in a sequence as shown in the table 2.

LED Blink sequence	Description
1	Normal operation
2	Previous wipe failed
3	Low battery shutdown

Table 2. LED blink sequence

Low battery shutdown occurs when the battery pack reaches around 6.5 volts. In this mode no further wipes are performed.

When the Hydro-Wiper is switched on, the wiper will perform an immediate wipe.

When closing the battery housing cap prior to deploying, always service the O-ring;

- 1) Using the O-ring pick provided with the Hydro-Wiper, carefully remove the O-ring from the groove in the wiper housing.
- 2) Clean the O-ring, and the O-ring groove using a tissue. Also clean the sealing face on the inside of the cap.
- 3) Wipe some O-ring grease, provided with the Hydro-Wiper, onto the sealing face on the inside of the cap, and also onto the O-ring.
- 4) Replace the O-ring into the groove in the battery housing

Screw the cap onto the battery housing until it is just hand tight. Do not over tighten or use the cap shifting tool to tighten the cap.

The wiper drive shaft features a slip mechanism, so the wiper arm can be manually moved if necessary, without causing any damage. This also protects the gearbox from damage in the event the wiper arm is subject to force or shock loading.

The Hydro-Wiper routinely monitors the position of the wiper arm. If the wiper arm is moved in front of the turbidity sensor, the Hydro-Wiper will detect this, and move the wiper arm to one side.

If the wiper arm becomes jammed at any stage during a wipe, the direction of rotation will be reversed in an attempt to dislodge the obstruction. If this is un-successful, the Hydro-Wiper will abort the

wipe. The diagnostic LED will flash twice every 15 seconds whilst this situation continues.

## **Maintenance**

The Hydro-Wiper requires very little maintenance, and should provide reliable operation for many years.

The only user replaceable part, apart from the batteries, is the brush. Under normal conditions, the brush should last many thousands of wipes. If however the brush does need replacement, these can be obtained from your supplier or directly from Zebra-Tech Ltd.

## Specifications

**Wipe interval;** User select (15,30,45,60,120,180,240,300,360 or 720 minutes)

**Clock accuracy;** +/- 1 minute per year (0 - 40° C)

**Power supply;** 6 x Alkaline AA batteries

**Power consumption;** Quiescent, 0.02mA, ~ 80 mA during a wipe

**Deployment endurance;** Wipe interval dependent. In excess of 4 months with a 2 hour wipe interval

**Brush;** User replaceable

**Battery Housing O-ring;** #142 (2 3/8" x 3/32")

**Construction;** Stainless steel, acetal

**Wiper shaft;** Multiple bearing support with quad ring seal

**Depth rating;** 30m

**Cable;** EPDM jacketed cable between the wiper and battery housing (1 meter standard length).

**Cable entry;** Cable glands with O-ring sealed back-inserts.

## Options

Extended depth rating; 100m

Impulse wet pluggable connectors on the wiper and/or battery housing

Additional cable between the wiper and battery housing

External trigger input to control the wiper



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