

Hydro-Wiper A

Self-contained Anti-fouling Wiper for the
Seapoint Turbidity Meter



Installation and Operation Manual

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1. Hydro-Wiper at a glance

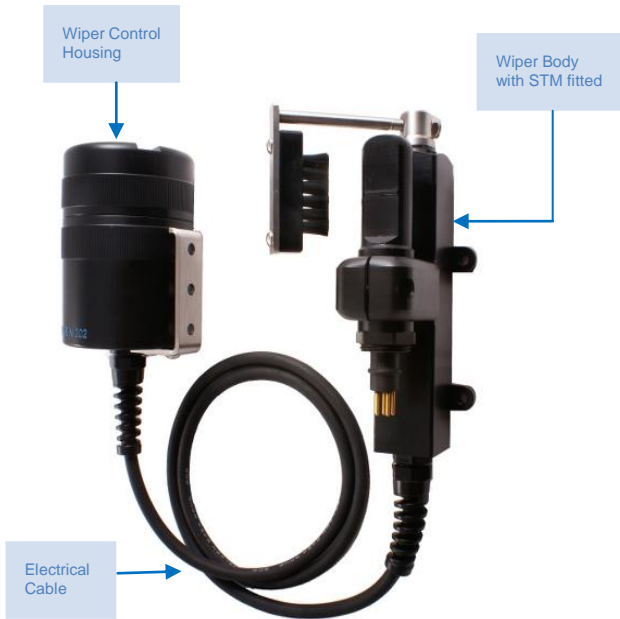


FIGURE 1: HYDRO-WIPER A WITH SEAPOINT TURBIDITY METER FITTED

The **Hydro-Wiper A** is a mechanical wiper system designed to fit easily to the Seapoint Turbidity Meter (STM). Using a regular gentle brushing action, the Hydro-Wiper keeps the optical window of the STM clean from bio-fouling and other unwanted deposits such as mud.

The Hydro-Wiper reduces the need for costly site visits to manually clean the instrument, maintaining data integrity throughout long deployments.

Features

Your **Hydro-Wiper A** offers the following features:

- Easy to install and simple to operate
- Ultra-low power consumption for long term deployments
- High precision wipe interval timing for minimal clock drift during long deployments
- Slip clutch protects gear box from damage if the wiper arm is knocked
- Brush design that has been extensively field proven in extreme conditions around the world
- On board self monitoring for reliable operation; if the wiper arm is knocked in front of the instrument face, the wiper arm automatically moves to one side.

2. Hydro-Wiper specifications

Hydro-Wiper schematics

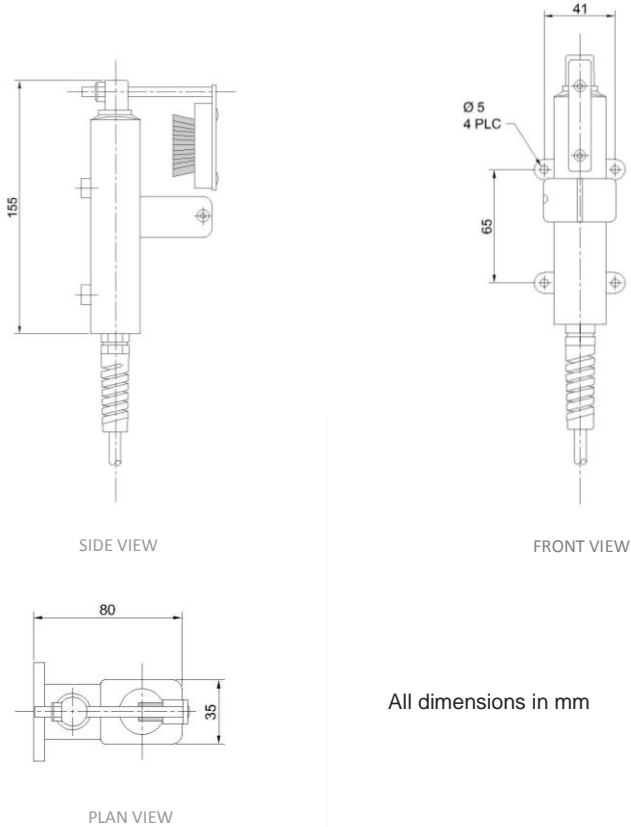
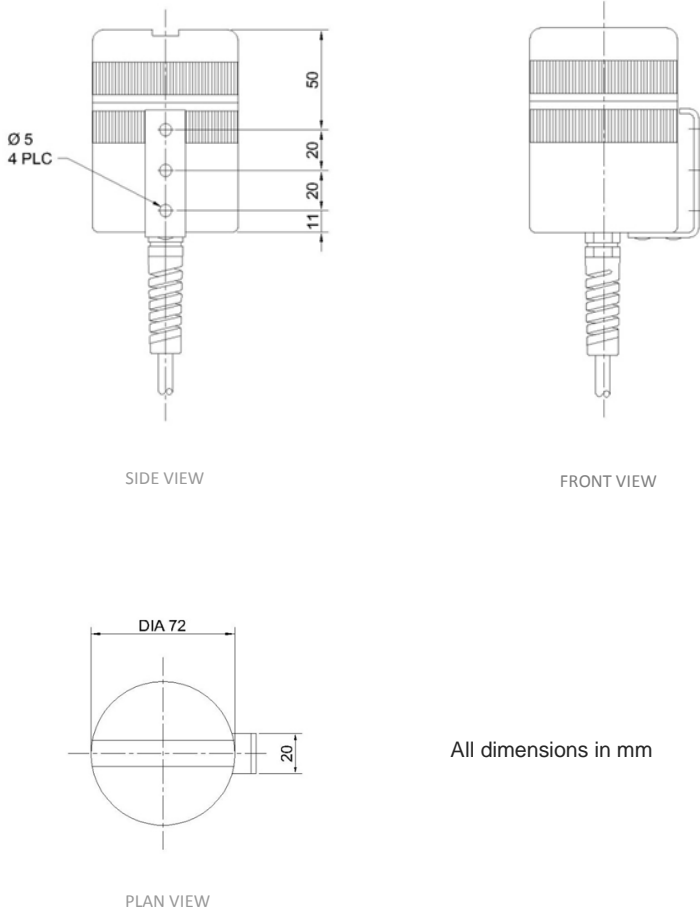


FIGURE 2: HYDRO-WIPER A SCHEMATICS



All dimensions in mm

FIGURE 3: HYDRO-WIPER A BATTERY HOUSING SCHEMATICS

Specifications

Wipe Interval:	User select (15, 30, 45, 60, 120, 180, 240, 300, 360 or 720 mins)
Clock Accuracy:	+/- 1 minute per year (0-40oC)
Power Supply:	6 x alkaline AA batteries
Power Consumption:	Quiescent, 0.02mA, ~80mA 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:	Passivated Stainless steel, Acetal
Wiper Shaft:	Multiple bearing support with quad ring seal
Depth Rating:	30 meters as standard
Cable:	EPDM jacketed cable between the wiper and battery housing (1 meter standard length)
Cable Entry:	Cable glands with strain relief, O-ringed puck and resin back fill

TABLE 1: HYDRO-WIPER A SPECIFICATION TABLE

Options

The following additional options are also available with your **Hydro-Wiper A** product:

Extended Depth Rating:	100 meters
Connectors:	Impulse wet pluggable connectors on the wiper and/or battery housing
Cable:	Additional cable between the wiper and battery housing
External Trigger:	External trigger input to control the wipe operation

TABLE 2: HYDRO-WIPER OPTIONAL EXTRAS

3. Hydro-Wiper components

Your **Hydro-Wiper A** is supplied as a fully self-contained and complete system. It consists of the following components:

- Wiper body, to which the Seapoint Turbidity Meter is attached
- Wiper control housing. In addition to the batteries, the wiper control housing contains the control electronics, power switch, wiper interval select switch and diagnostic LED.
- An electrical cable connecting the wiper body to the control housing
- Field tool kit.

Wiper body

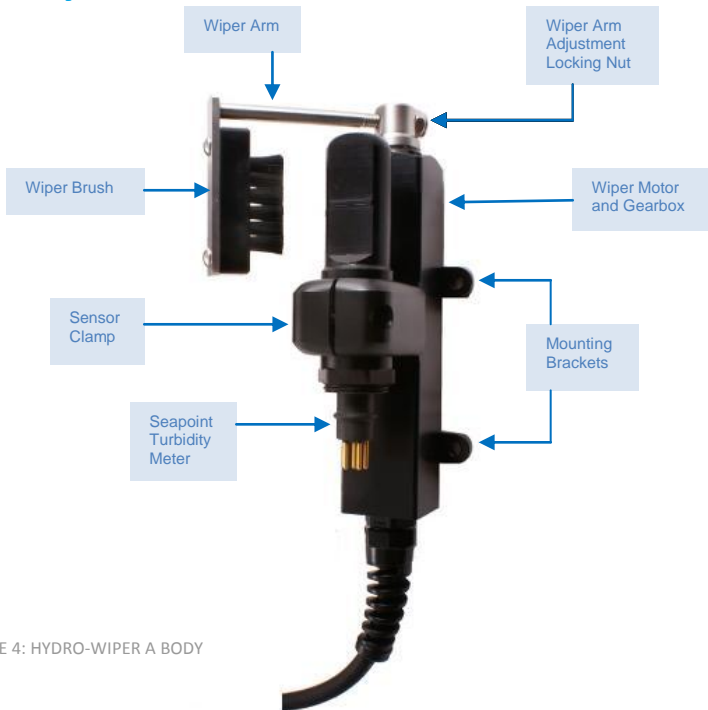


FIGURE 4: HYDRO-WIPER A BODY

The wiper body consists of:

- Wiper motor and gearbox
- Wiper shaft position sensing system
- Wiper arm with brush.
- Mounting clamp for the **Seapoint Turbidity Meter**.

Wiper control housing

The wiper control housing contains:

- Batteries
- Control electronics
- On/off power switch
- Wipe interval select switch
- Diagnostic LED indicator.



FIGURE 6: INSIDE THE HYDRO-WIPER A CONTROL HOUSING



FIGURE 5:
HYDRO-WIPER A
CONTROL HOUSING

Electrical cable

The **Hydro-Wiper A** is fitted with 1 metre of cable between the wiper body and control housing as standard. However, the length of cable required varies depending on the type of installation. Additional cable can be fitted at the factory when the Hydro-Wiper is built. Please specify the cable required when ordering.

Field tool kit

The field tool kit supplied with the **Hydro-Wiper A** contains:

- Lid shifting tool
- O-ring pick
- Spare control housing O-ring
- O-ring grease
- Replacement set of batteries
- Screwdriver for adjusting the wipe interval switch.

4. Preparing for deployment

Fitting the Seapoint Turbidity Meter into the instrument clamp

Insert the Seapoint Turbidity Meter (STM) into the clamp, with the optical window facing directly away from the wiper housing. The brush arm can be manually moved to check the STM is correctly positioned. **Ensure the Hydro-Wiper is switched off when manually rotating the wiper brush.** Reposition the STM if necessary. Tighten the clamp set screw to secure the STM into the clamp.

Adjusting wiper brush pressure

The brush is mounted on an adjustable arm. The length of the arm controls the brush pressure applied to the face of the STM. This has been factory set and should not need adjustment.

The success of the Hydro-Wiper is based on the brush **sweeping lightly** across the optical window at regular intervals – it is not a scrubbing action. If there is excessive pressure, the life of the brush will be reduced and damage to the optical surface of the STM may occur. If the brush pressure is insufficient, contact between the brush and optical window will be lost in the centre of the window and fouling may occur.

If it is necessary to adjust the brush pressure, loosen the lock nut at the end of the wiper arm and rotate the wiper arm in the desired direction. Tighten the lock nut after adjustment.

Mounting the wiper body

Use the brackets located on the back of the wiper body to attach it to the desired mounting structure.

Mounting the wiper control housing

Use the marine grade (316) stainless steel bracket attached to the wiper control housing to attach the wiper control housing to the required structure.



NOTE!

Avoid attaching the bracket directly to a metal structure. Doing so can cause electrolysis, which may result in rapid deterioration of the metal parts.

Securing the wiper cable

Use cable ties to secure the wiper cable to avoid possible snags and fouling.



NOTE!

Do not allow the cable to constantly move with the water currents as fatigue and eventual failure may result.

5. Operating the Hydro-Wiper

Opening and closing the wiper control housing

To open the wiper control housing, unscrew the lid in an anti-clockwise direction. If the lid is tight, use the lid shifting tool supplied with your Hydro-Wiper. This tool fits into the groove in the top face of the cap and allows greater leverage.

To close, 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.**

**NOTE!**

Always clean and service the O ring before closing the lid. Refer to the maintenance section of this manual for instructions on doing this.

Installing the battery

Switch off the Hydro-Wiper using the power switch. Gently pull the battery connector off the battery holder contacts. Remove the battery holder from the control housing and insert 6 x AA batteries into the battery holder. Check all the batteries are correctly orientated. Put the battery holder back into the control housing. Re-attach the battery connector to the battery holder contacts. Switch on the Hydro-Wiper. The LED should flash 4 times and then a wipe is performed.

**NOTE!**

Use only good quality AA 1.5 volt alkaline batteries (eg. *Energizer* or *Duracell* brand).

Setting the wipe interval

The wipe interval is the period of time between the start of one wipe and the start of the next wipe. This is controlled by the position of the wipe interval switch. Set the wipe interval switch at the desired setting (refer to the table below) using the screwdriver provided in the field kit.



NOTE!

Ensure the Hydro-Wiper is switched off when adjusting the wipe interval.

Wipe Interval Switch Position:	Wipe Interval:
0	15 minutes
1	30 minutes
2	45 minutes
3	60 minutes
4	120 minutes
5	180 minutes
6	240 minutes
7	300 minutes
8	360 minutes
9	720 minutes

TABLE 3: WIPE INTERVAL SELECT SWITCH SETTINGS

The optimal wipe interval will depend on environmental conditions at the field site. Generally a wipe interval of 2 to 3 hours should prove sufficient to keep the sensor clean in moderate fouling conditions.

The Hydro-Wiper wipe interval timer starts 0.5 seconds after the power is switched on. To avoid the wiper affecting the sensor measurements, start the Hydro-Wiper out of sequence with the measurement schedule. For example, if the sensor measurements are scheduled every hour on the hour, start the Hydro-Wiper at 30 minutes past the hour.

LED Status Indicator

When the Hydro-Wiper is switched on the LED status indicator will blink 4 times and then a wipe will be performed. During deployment the LED will blink every 15 seconds. The number of blinks indicates the performance status of the Hydro-Wiper. Under normal operation, the LED will blink once. If a fault exists, the LED will blink in a sequence as shown in table 4.

LED Blink Sequence:	Status Description:
Once every 15 seconds	Normal operation
Twice every 15 seconds	Previous wipe failed
Three times every 15 seconds	Low battery shutdown

TABLE 4: LED INDICATOR BLINK SEQUENCE

During deployment

Unpredictable events can happen during a deployment. The Hydro-Wiper has been designed to withstand the harsh nature of field deployments.

- 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 wiper gearbox from damage in the event the wiper arm is subject to force or shock loading during deployment.
- The Hydro-Wiper routinely monitors the position of the wiper arm. If the wiper arm is moved in front of the 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 unsuccessful, the Hydro-Wiper will abort the wipe. The diagnostic LED will flash twice every 15 seconds whilst this situation continues.

6. Maintenance

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

Replaceable Hydro-Wiper parts

The only replaceable parts are the batteries and the wiper brush. Under normal conditions the wiper brush should last many thousands of wipes. However, should your wiper brush require replacement, these are inexpensive and can be obtained directly from Zebra-Tech Ltd or your Hydro-Wiper reseller.

Servicing the Wiper Control Housing O-ring

Service the O-ring each time you open the wiper control housing and before deployment.

- 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, the O-ring groove and the sealing face on the inside of the lid using a tissue.
- 3** Inspect the O-ring for cracks, deterioration or damage. Replace the O-ring if necessary. A spare O-ring is provided in the field kit that is supplied with the Hydro-Wiper.
- 4** Wipe some of the O-ring grease provided with your Hydro-Wiper onto the O-ring and the sealing face on the inside of the lid.
- 5** Replace the O-ring into the groove in the battery housing.

7. Troubleshooting

Wipe failure

Should the wiper arm jam during a wipe due to an obstruction, it will attempt to dislodge itself by undergoing a series of direction reversals. If unsuccessful, the wipe will be aborted, and the LED will blink 3 times every 15 seconds until the next wipe is due.

**NOTE!**

The Hydro-Wiper is not damaged in the event of the wiper arm becoming completely jammed by an obstruction.

**NOTE!**

The LED indicator will blink twice every 15 seconds when the Hydro-Wiper has failed to complete the last scheduled wipe.

Low battery shutdown

Low battery shutdown occurs when the battery pack reaches around 6.5 volts. No wipes will be performed when the Hydro-Wiper is in low battery shutdown mode.

**NOTE!**

The LED indicator will blink three times every 15 seconds when the Hydro-Wiper is in low battery shutdown mode.

8. Further Assistance

For further assistance with this or any other **Zebra-Tech** product, please contact:

Zebra-Tech Ltd
PO Box 1668
Nelson 7040
New Zealand

Tel: International 0064 3 548 0468

Fax: International 0064 3 548 0466

Email: enquiry@zebra-tech.co.nz

Hydro-Wiper models currently available

Hydro-Wiper Model:	Instrument:
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
Hydro-Wiper F	Chelsea TriLux
Hydro-Wiper G	RBR XR-420
Hydro-Wiper H	LiCor Li-192
Hydro-Wiper I	TriOS Ramses-ACC
Hydro-Wiper J	Turner Designs Cyclops-7
Hydro-Wiper K	D&A OBS-3A
Hydro-Wiper L	Seapoint Fluorometer
Hydro-Wiper M	Eco Triplet
Hydro-Wiper N	Apogee PAR

For up to date information about the Hydro-Wiper and other models available, please visit the **Zebra-Tech Ltd** website at: <http://www.zebra-tech.co.nz>.

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