



ZEBRA-TECH LTD

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Instrumentation and equipment for
environmental monitoring and research

DATA LOGGER CONTROLLED HYDRO-WIPER OPERATION MANUAL



TABLE OF CONTENTS

- 1. INTRODUCTION.....3
 - Features.....4
- 2. HYDRO-WIPER SPECIFICATIONS.....5
 - Control module schematics.....5
 - Options.....6
- 3. HYDRO-WIPER COMPONENTS.....7
 - Wiper body.....7
 - Wiper control module.....8
 - Electrical cable.....8
- 4. PREPARING FOR DEPLOYMENT.....9
 - Fitting your optical sensor into the Hydro-Wiper clamp.....9
 - Adjusting the wiper brush pressure.....9
 - Mounting the wiper control module.....11
 - Connector handling instructions.....11
 - Securing the wiper cable.....11
 - Adjusting the wipe angle.....12
 - LED status indicator.....13
 - During deployment.....13
- 5. OPERATING THE HYDRO-WIPER.....14
 - Knocking or jolting the Hydro-Wiper arm.....15
- 6. MAINTENANCE.....16
 - Replaceable Hydro-Wiper parts.....16
- 7. TROUBLESHOOTING.....17
 - Wipe failure.....17
- 8. FURTHER ASSISTANCE.....18

1. INTRODUCTION

The Hydro-Wiper is a mechanical wiper system designed to fit easily to a variety of optical instruments. Using a regular gentle brushing action, the Hydro-Wiper keeps the optical window of the instrument 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.

This manual is supplied with all standard data logger controlled Hydro-Wipers and provides an overview of installation and operation. If technical assistance is required, please do not hesitate to contact Zebra-Tech. Our contact details are on page 18.



FEATURES

Your Hydro-Wiper offers the following features:

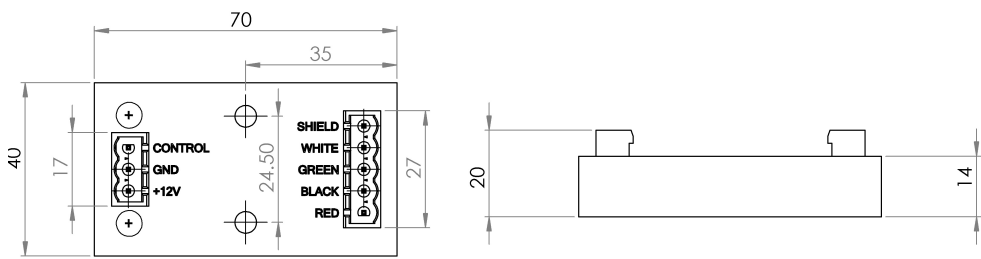
- Easy to install and simple to operate
- Ultra-low power consumption for long term deployments
- Adjustable wipe angle
- Slip clutch that protects gear box from damage if the wiper arm is knocked
- Brush design that has been extensively field proven in extreme conditions around the world
- On board 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

Control input:	The wiper control module has an internal 10k pull down resistor. The control line needs to be set high to + 5 volts for a minimum of 10 milliseconds to initiate a wipe.
Power supply:	Between 8 and 24 volts DC
Power consumption:	
Between wipes:	0.06mA
During a wipe:	Typically 90mA. If the wiper arm is jammed, power consumption can momentarily rise to around 500mA.
Brush construction:	PVC stock, stainless staples, nylon bristle. User replaceable. Passivated stainless steel, acetal
Wiper shaft:	Multiple bearing support with quad ring seal
Depth rating:	30m as standard
Cable:	EPDM jacketed 4 core screened cable between the wiper housing and wiper control module
Cable entry:	Cable gland with strain relief, O-ringed puck and resin back fill

TABLE 1: HYDRO-WIPER SPECIFICATION TABLE

HYDRO-WIPER CONTROL MODULE SCHEMATICS



OPTIONS

Options

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

Extended Depth Rating:	100 meters
Connectors:	Wet pluggable

TABLE 2: HYDRO-WIPER OPTIONAL EXTRAS

3. HYDRO-WIPER COMPONENTS

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

- Wiper body, to which the optical instrument is attached
- Wiper control module. The wiper control module incorporates a micro-processor which intelligently manages the wipe operation.
- An electrical cable connecting the wiper body to the control module
- Field tool kit.

WIPER BODY

The wiper body consists of:

- Wiper motor and gearbox
- Wiper shaft position sensing system
- Wiper arm with brush
- Mounting clamp for the optical instrument
- Anode



WIPER CONTROL MODULE

The wiper control module contains:

- Micro-processor
- Trigger input connected to the control port of a data logger
- Adjustable wipe angle controls
- LED status indicator



ELECTRICAL CABLE

The Hydro-Wiper is fitted with cable between the wiper body and the control module. Please specify the length of cable required when ordering.

4. PREPARING FOR DEPLOYMENT

FITTING YOUR OPTICAL SENSOR INTO THE HYDRO-WIPER CLAMP

If you require technical assistance fitting the Hydro-Wiper to your instrument, please contact Zebra-Tech. See page 18 for our contact details.

ADJUSTING WIPER BRUSH PRESSURE



NOTE!

Ensure the Hydro-Wiper is switched off when manually rotating the wiper brush.

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 surfaces may occur. If the brush pressure is insufficient, contact between the brush and optical window will be inadequate and fouling may occur.

There are two methods to adjust the brush pressure depending on the orientation of the brush. Vertical brushes are for instruments with the optical window on the side. Horizontal brushes are for instruments with the optical window on top of the sensor.

1. Vertical brushes:

The brush is mounted on an adjustable arm. The length of the arm controls the brush pressure applied to the face of the sensor. This is generally factory set and should not need adjustment unless you are changing sensors.

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.

2. Horizontal brushes:

The amount of brush pressure can easily be adjusted by sliding the sensor upwards or downwards in the clamp. Do this by loosening the clamp screw and tightening again once you have made the desired adjustment.



Vertical Brush - Adjust arm



Horizontal Brush - Adjust clamp

MOUNTING THE WIPER CONTROL MODULE

The wiper control module is not water proof. It should be mounted inside a weather-proof housing, ideally adjacent to the controlling data logger. The ground (GND) connection of the wiper control module must be connected to both the power supply ground and the data logger control ground.

The power supply to the Hydro-Wiper must be between 8 and 24 volts DC and capable of supplying around 90mA during a wipe and momentarily up to 500mA if the wiper arm becomes jammed.

CONNECTOR HANDLING INSTRUCTIONS (100m depth rated Hydro-Wipers)

- Pins and sockets must be clean before mating.
- Periodically lubricate pins with light application of silicone spray.
- Do not use penetrating oil on or near the connector. This will cause permanent damage.
- Ensure correct alignment before mating.
- When separating, never pull on the cable. Do not twist or bend, always pull straight.

SECURING THE WIPER CABLE

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

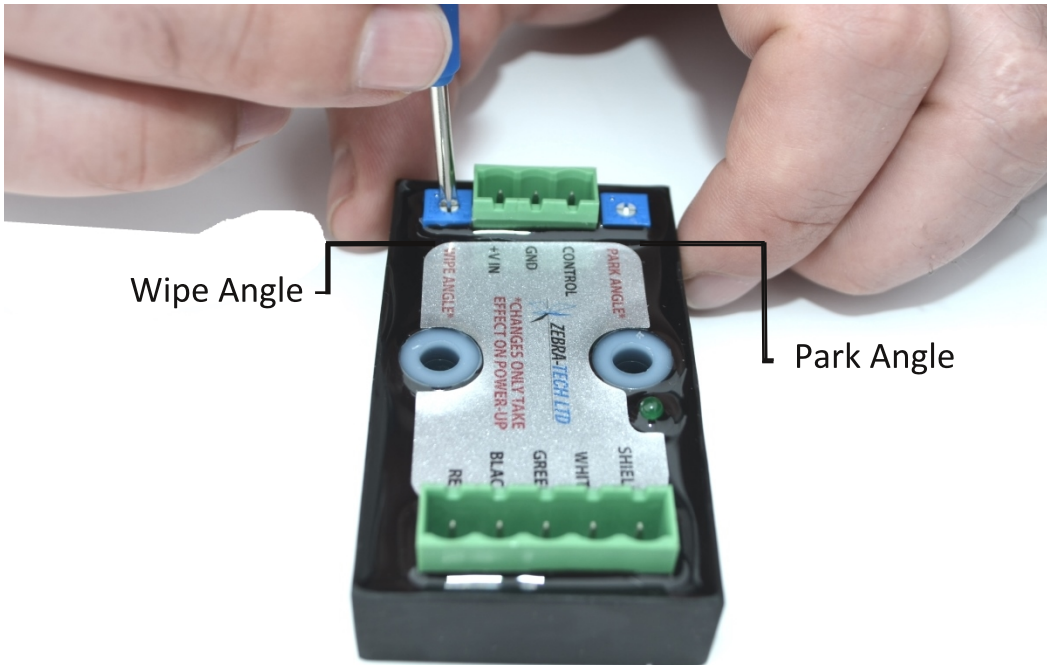


Do not allow the cable to constantly move with the water currents as fatigue and eventual failure may result.

ADJUSTING THE WIPE ANGLE

Both the wipe and park angles of your Hydro-Wiper have been factory set to suit the sensor for which it was built. However, there may be circumstances when you would like to alter these angles. This may arise when converting your Hydro-Wiper for use with a different instrument or, in the case of a Multi-Wipe Hydro-Wiper, deploying fewer sensors than the Hydro-Wiper is capable of accommodating.

To adjust either the wipe or the park angle, locate the blue controls as pictured below. **Ensure control module is disconnected from the power supply before adjusting.**



For both controls, turning clockwise will increase the angle. Turning counter-clockwise will decrease the angle. Park angle determines where the wiper will stop between wipes. Wipe angle determines how far the wiper will sweep.

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 wipe 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.

5. OPERATING THE HYDRO-WIPER

On power up, if not already at the start position, the wiper arm will first rotate to the start position. From the start position, the brush will wipe across the face of the optical instrument and then return to the start position.

The Hydro-Wiper will wait until a control trigger is received from the data logger before another wipe is performed. The Hydro-Wiper power consumption between wipes is very low, around 0.06mA.

When the control line of the wiper control module is driven high (+5 volts) by the data logger, a wipe is initiated. The brush sweeps across the face of the optical instrument, stops and then sweeps in the opposite direction back to the starting position. A wipe typically takes about 10 seconds to complete.

After the control line has gone high, it will need to go low (0 volt) prior to going high to initiate another wipe. If the control line stays high, another wipe will not occur until the control line goes low, then high again.

The optimal frequency of wiping the optical instrument depends on the rate of fouling. Under typical conditions, a wipe interval of 2 to 4 hours should be adequate to prevent fouling, however this may be increased or decreased depending on the characteristics of the site.

The optimal timing of a wipe is just prior to taking a measurement with the optical instrument. It is recommended that a small time interval occurs between the wipe and the measurement to allow debris dislodged during the wipe to settle. The LED on the wiper control module will flash once every 15 seconds if the Hydro-Wiper is operating correctly.

KNOCKING OR JOLTING THE HYDRO-WIPER ARM

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.



NOTE! 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.

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, wiper brush and anode button.

Under normal conditions the wiper brush should last many thousands of wipes. However, should your wiper brush require replacement, these are inexpensive and obtainable directly from Zebra-Tech Ltd or your Hydro-Wiper reseller.

Anodes reduce corrosion of the Hydro-Wiper shaft in harsh environments. Replacement anode buttons can be purchased from Zebra-Tech or your local Hydro-Wiper reseller. To replace the anode button, simply unscrew the old one and swap it.

From 2017, anodes have been supplied with new Hydro-Wipers as standard. However, anodes can be added to legacy Hydro-Wipers. Please contact Zebra-Tech for more information.

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.



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
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Nelson 7040
New Zealand

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For up to date information about the Dive Caliper and other products available, please visit the Zebra-Tech Ltd website at:

www.zebra-tech.co.nz

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