

Hydro-Wiper Operation Manual

Hydro-Wiper # C for OBS3+ sensor
External trigger controlled version



Overview

The Hydro-Wiper is a mechanical wiper system designed to be easily fitted to the D&A OBS 3+.

By wiping at regular intervals, the Hydro-Wiper keeps the optical window of the OBS3+ clear of bio-fouling and other deposits such as mud. This reduces the necessity for costly site visits to manually clean the sensor, and maintains data quality throughout the deployment.

The Hydro-Wiper consists of a wiper body that the OBS3+ is clamped onto. The wiper body is connected to a wiper control module by a cable. The wiper control module has a trigger input, which is connected to the control line of a data-logger. When the control line is driven high (+5 volt) by the data logger, the Hydro-Wiper performs a wipe.

The wiper drive shaft features a slip mechanism which prevents damage to the wiper motor gearbox if the wiper arm is knocked or jolted during the deployment.

The wiper control module incorporates a micro-processor, which intelligently manages the wipe operation. The wiper control module also monitors the position of the wiper arm between wipes. If the wiper arm is knocked or jolted so that it is in the region in front of the OBS3+, then the Hydro-Wiper will detect this and move the wiper arm to one side.

The Hydro-Wiper has been carefully designed for minimal power consumption, making it suitable for remote field sites, where power availability maybe limited.

Installation

The OBS3+ is mounted in the clamp at the front of the wiper, with the optical window facing directly away from the Hydro-Wiper. The OBS3+ should be positioned so that the brush sweeps across the whole surface of the optical window (Photo 1).



Photo 1. Mounting the OBS3+ in the Hydro-Wiper clamp

While setting up the Hydro-Wiper, the brush arm can be manually moved to check the OBS3+ is correctly positioned. Ensure that the Hydro-Wiper is not powered up prior to doing this.

The brush is mounted on an adjustable arm. The length of the arm controls the brush pressure applied to the face of the OBS3+. This has been factory set, and should not need adjustment.

If it is necessary to adjust the brush pressure, this can be done by loosening the lock 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.

If there is excessive brush pressure, the life of the brush will be reduced and damage to the optical surface of the OBS3+ 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.

The cable between the wiper housing and wiper control module should be fully secured in position. If it is free to constantly move in the water currents, damage from fatigue and eventual failure may result.

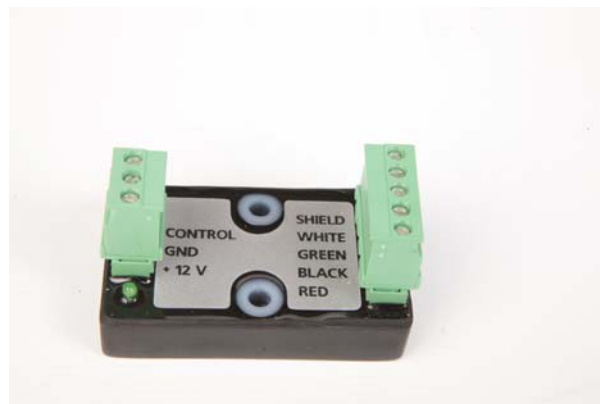


Photo 2. Wiper control module

The wiper control module is not water proof, and 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 +12 volt supply ground, and the data logger control ground.

The power supply to the Hydro-Wiper must be between 8 and 15 volts DC, and capable of supplying around 90mA during a wipe, and momentarily up to 500mA if the wiper arm becomes jammed.

The control connection of the wiper control module is connected to the data logger control port. The control port needs driven to +5 volts for longer than 10 milliseconds to trigger a wipe.

The wiper control module is fitted with plug-in screw terminals. This simplifies passing the cable through a gland in the data logger cabinet.

Operation

Warning

When power to the Hydro-Wiper is switched on, the wiper arm will immediately start moving.

On power up, if the wiper arm is not at the start position, then the wiper arm will first rotate to the start position. From the start position, the brush will wipe across the face of the OBS3+, and then move back to the start position, thus brushing the OBS3+ face in two directions.

The Hydro-Wiper will then wait until a control trigger is received from the data logger before a wipe is performed. The Hydro-Wiper power consumption between wipes is very low; around 0.05mA.

The Hydro-Wiper regularly monitors the position of the wiper arm between wipes. If it gets knocked or jolted into the region in front of the OBS3+, this is detected, and the wiper arm is moved to one side.

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 OBS3+, stops, and then sweeps back in the opposite direction to the starting position. A wipe typically takes around 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 OBS3+ 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 timing of the wipe is optimally just prior to making a measurement with the OBS3+. It is recommended that a small time interval occurs between the wipe and the measurement, to allow for settling of debris dislodged during the wipe.

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 after a number of attempts, then the Hydro-Wiper will abort the wipe. As a result, the Hydro-Wiper is not damaged by a jammed wiper arm.

The wiper control module features an LED. On power-up, the LED will flash once. The LED will then flash once every 10 seconds. If the wiper arm becomes jammed, and the wipe is not completed successfully, the LED will flash twice every 10 seconds, until the wiper arm becomes free and a successful wipe is completed.

Maintenance

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

The only user replaceable part 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

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; 8-15 volts DC

Power consumption between wipes; 0.05mA,

Power consumption during a wipe; Typically 90 mA. If the wiper arm is jammed, power consumption can momentarily rise to around 500mA.

Brush; PVC stock, stainless staples, nylon bristle. User replaceable

Construction; 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, with O-ringed puck and resin back fill.

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