UV Sensor Maintenance & Reference Check

Reference Documents:
GD1- UV Sensor Replacement Kit
GH42 – UV Sensor Hot Swap Procedure

The UV sensors used within the Hallett systems produced by UV Pure Technologies perform the vital task of monitoring system performance in real-time. They provide a signal to the controller of the unit to determine UV dose applied, UV Intensity of the lamps, and Ultraviolet Transmittance (UVT) of the water.

UV Pure uses a pair of silicon carbide photodiodes within each UV sensor array. Despite the high levels of radiation hardness that these devices exhibit, periodic checking and/or calibration is recommended.

In a normal environment, it is recommended to check the UV sensor after 12-16 months of operation for any regulated site - the sensor maintenance can coincide with the UV lamp replacement as indicated in the table below

Schedule

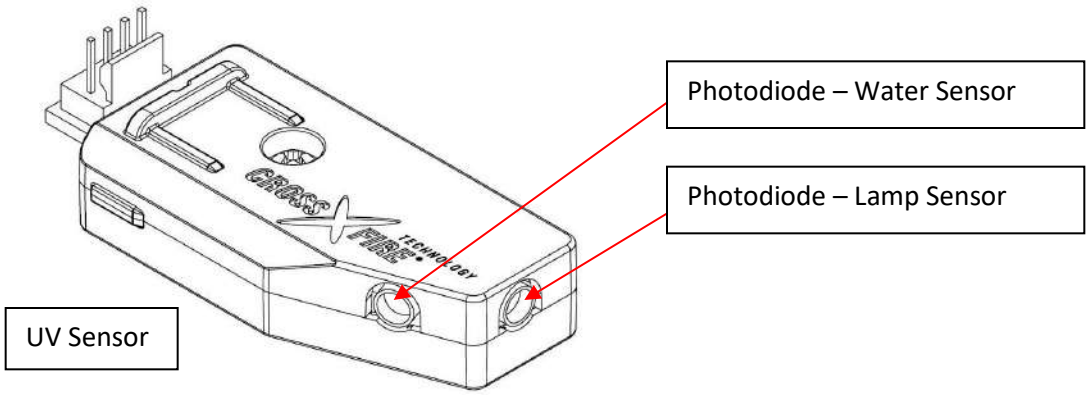
Model	UV Lamp Lifetime – UV Sensor Maintenance	UV sensor(s) / unit	UV sensor P/N
Hallett 500XX - P, PN, R, W, NC	12 months	1	GD1
Hallett 750XX - P, PN, R, W, NC	12 months	1	GD1
Hallett 1000XX - P, R, W, NC	16 months	2	GD1

Tasks to be Performed

The following tasks should only be performed by technicians trained to operate Hallett systems.

1. Inspection* – Whenever a duty UV sensor is removed from service, inspect the faces of the photodiodes for dust, debris, films, or water marks. The lens of the photodiode should be perfectly clear. See Reference documents for UV sensor removal.

*In a dusty environment, inspections of the UV sensors should be done more frequently. Clean as required. Note that if the UV sensor is dusty, the quartz sleeve and the UV lamps are likely to be dusty as well. Replace the air filter at the bottom of the unit frequently.



2. Cleaning – If there is any dust or film on the face of the photodiode, it can be wiped off with a soft cloth and rubbing alcohol (isopropyl). Do Not Immerse.

3. Reference check – A UV sensor will typically drift downward over time as it is continuously exposed to UV light – this drift will cause the unit to alarm prematurely. The purpose of the reference check is to compare the performance of the duty sensor to a reference sensor. A reference sensor is a new sensor (less than 50 hours of operation) that has been calibrated within the last 3 years.

   It is critical that the UV unit is in a steady state condition when the values of the duty sensor and reference sensor are recorded for the comparison - wait at least 10 to 15 minutes for lamps to stabilize with water flowing and do not take reading during a wiper cycle.

   Use the table at the end of the document to record the values.

4. Recalibration – In most cases, if the values of the duty sensor vary more than 5% from the reference sensor, the duty sensor should be recalibrated. If the UVT or UV dose is low and very close to the unit's alarm threshold, then the duty sensor should be recalibrated if more than 3% from the reference sensor.

   To determine limits:
   +/- 3% : Take reference sensor value and multiply by 0.97 for low end, 1.03 for high end
   +/- 5% : Take reference sensor value and multiply by 0.95 for low end, 1.05 for high end

5. Replacement – Replace the UV sensor if it fails to respond (same mV value despite the amount of UV exposed) or shows instability (significantly drifts up or down in steady state conditions). Other reasons for replacement: surface of photodiodes cannot be cleaned; more than 3 calibrations have already been performed; the UV sensor is over 5 years old and requires recalibration.

Reference Sensor Check Log Sheet

Date	
Model #	
Unit #	

Location	
Serial #	
Operator Name	

EXAMPLE Left Sensor	Duty Sensor S/N G00436	Reference Sensor S/N G01075	- 3%	+ 3%	- 5%	+ 5%	Is duty sensor within 3% limits?	Is duty sensor within 5% limits?	Recalibrate Sensor?
Lamp Value	1350	1400	1358	1442	1330	1470	No	Yes	No
Water Value	786	800	776	824	760	840	Yes	Yes	

Left Sensor	Duty Sensor S/N	Reference Sensor S/N	- 3%	+ 3%	- 5%	+ 5%	Is duty sensor within 3% limits?	Is duty sensor within 5% limits?	Recalibrate Sensor?
Lamp Value									
Water Value									

Right Sensor	Duty Sensor S/N	Reference Sensor S/N	- 3%	+ 3%	- 5%	+ 5%	Is duty sensor within 3% limits?	Is duty sensor within 5% limits?	Recalibrate Sensor?
Lamp Value									
Water Value									