Hukx pyranometers in corrosive, salty and marine environments

Best performance on the market

Hukx pyranometers are used all over the globe. Although not formally specified for corrosive salty or marine environments, they are successfully employed there. This note highlights:

– what we did in instrument design to avoid corrosion problems, and
– about the successful employment of pyranometers in a salt marsh

Introduction

Hukx pyranometers are used worldwide in all climates. Formal "rated operating conditions" do not include exceptional conditions such as polluted air, heavy hail, and sandstorms. Environments with a salty atmosphere are also excluded.

However, in reality, our instruments are operated in such environments—at the user's own risk. Hukx takes all possible measures to guarantee a long lifetime, even when working beyond rated conditions.

To protect against corrosion caused by salt, we did the following:

– Choice of materials: we work with high-grade (EN AW 6082) aluminum with an extra anodising layer. Corrosion protection is excellent.
– Testing: Pyranometers pass testing according to SAE J2334: Cyclic Corrosion Test – commonly called salt spray test - is used to characterise the corrosive performance of a design.
– Choice of materials: Hukx work with plastic IP67 connectors, injection moulded around the cable, with stainless steel threading.
– Instrument design: you can mount our pyranometers using one bolt at the bottom minimising exposure to salt and water. The thread in the instrument bottom employs a stainless steel (A2) helicoil minimising galvanic corrosion: Competing designs often use stainless steel bolts passing through the aluminum instrument body. Such 2-metal connection is sensitive to galvanic corrosion.
– Instrument design: spring-loaded leveling: adjustment is possible without touching or turning the connection bolts.
– Instrument design: closed sun screen, limiting the passage of rainwater and salt spray. Competing designs often have semi-open screens, which allow water to contact the instrument body.
– Separate earthing terminal: the bolts connecting the pyranometer to the mounting structure are sensitive to corrosion and are not suitable for grounding the sensor. Hukx sensors have separate ground lugs so that you can make the required stable and reliable low-electrical-resistance connection of the instrument body to the ground.

Figure 1 Corrosion protection: Hukx pyranometers, such as SR300-D1, are mounted from below with one bolt that is out of reach for water. No bolts through the housing.

Figure 2 The SR300-D1 has a seperate earthing terminal.

Figure 3 Corrosion protection: the bolt is spring-loaded. No bolts through the housing, that must be loosened when the instrument is levelled.

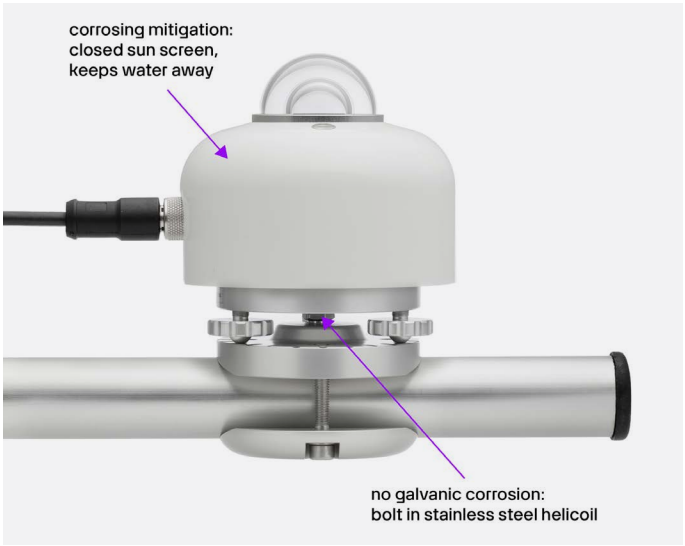

Figure 4 Corrosion protection: the bolt is spring-loaded, and is connected to the body with a stainless steel helicoil. No bolts through the housing, closed sunscreen

What not to do

The designers of the instrument in Figures 5 and 6 gave corrosion protection and instrument grounding a low priority.

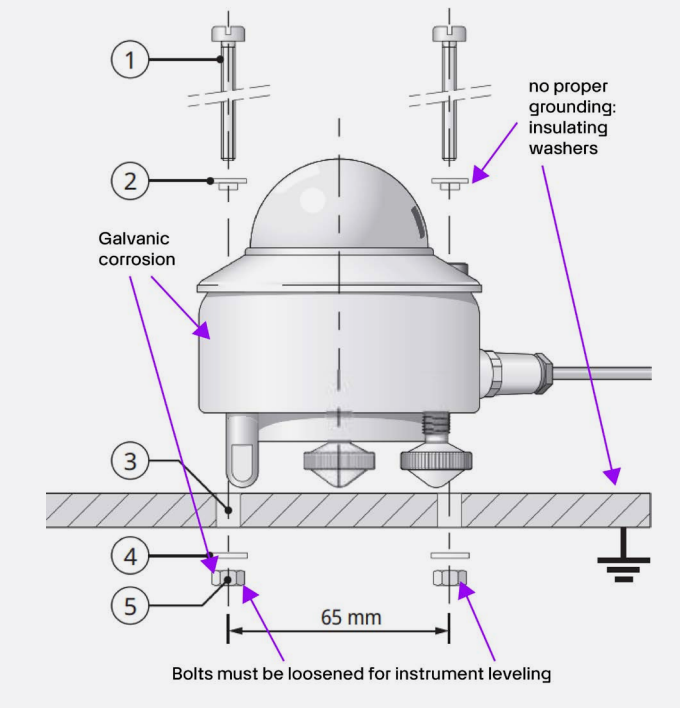

Figure 5 Competing pyranometer with bad corrosion protection and bad grounding: There are two stainless steel bolts (1) passing through the aluminum housing. This construction is very sensitive to galvanic corrosion. To prevent corrosion, 2 plastic washers (2) are added. Users know that this is not a reliable long-term solution.
The mounting plate is supposed to be grounding the pyranometer. However, the plastic washer (2) prevents electrical contact. The leveling feet are anodized aluminum and also are not suitable to make good electrical contact.

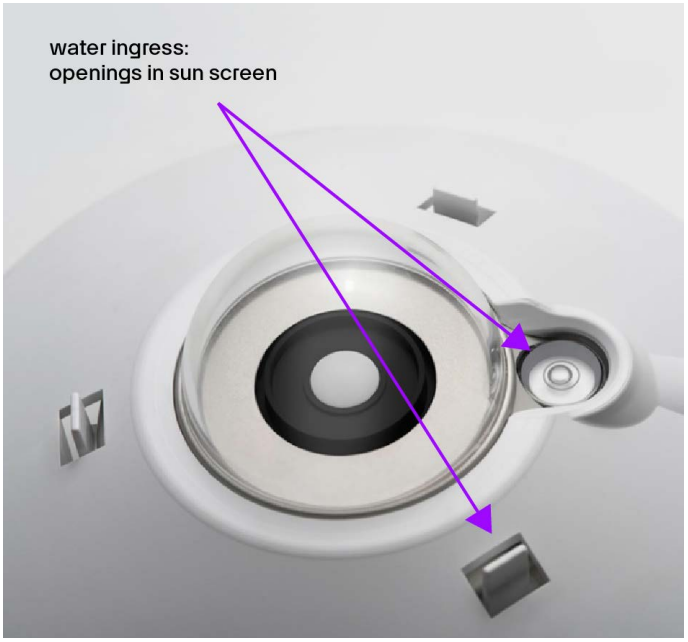

Figure 6 Competing pyranometer with open sun screen. Rainwater and salt spray can pass through openings in the sun screen.

Figure 8 The Hukx SR20 pyranometer with a VU01 ventilation unit at the Khavda PV power plant, next to a waterless cleaning robot.

Example application in a salty environment: Khavda Solar Park

The Gujarat Hybrid Renewable Energy Park is one of the largest energy parks in the world. The Khavda PV power plant is part of this park, located in the salt pans of the Great Rann of Kutch in India. The vast salt pans and salt marshes surrounding the site lead to high salinity in the air. Conditions are similar to the highly corrosive conditions near the sea. Successful deployment of more than 400 Hukx sensors (the installed capacity is almost 5 GW) in this environment shows that they are suitable for coastal areas.

Figure 7 The Khavda PV power plant.

About Hukx

Hukx is the leading innovator in solar radiation and heat flux sensor technology. We are proud to set the standard in high-accuracy measurement, and to be working at the heart of the energy transition.

Customers worldwide rely on our bestselling pyranometers and heat flux sensors. From sensor design and selection to supply and recalibration, we support you across the entire lifecycle.

Hukx is headquartered in the Netherlands, with locally owned representative sales offices in the USA, Brazil, India, China, Southeast Asia, and Japan.

Let us help you select the best sensor for your application.
Get in touch with our experts today via: info@hukx.com

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