



Cleaning solar panels with a proportional dosing system

Water meter, dosing pump and mixer combined in one device

By using a non-electric LDT Dosatron proportional dosing device, low-calcium water was produced in an in-house test in order to clean a solar panel system and thus increase energy efficiency again.

The 2.04 kilowatt photovoltaic system on house is now 20 years old, but cleaning of the solar cell modules has not yet taken place. The owner trusted the expert statements of the installers that the modules should be self-cleaning, means rain and snow should be enough for cleaning. Since the electricity meter always showed a current flow, it was assumed that everything is working fine.

An inspection of the bills have shown deviations in the injected electricity data, which could not be fully explained. So it came to inspecting the solar cells. It was found that the trees near the house took their toll in the form of a rich population of pollen and the entire area was covered with a film of pollens and other pollutants from dust, road traffic and bird droppings, especially in the areas from the glass to the frames. This is how the idea of cleaning the solar system was born.

Due to the 45 degree installation of the system directly on the roof, a direct inspection of the system is not possible. A skylight was not available in a suitable position and a scaffolding would be feasible, but have been too complicated and too expensive. Therefore, investments were made in a water-carrying telescopic pole with a soft brush and a microfibre cloth. The 4 meter-long ladder already exists.

The cleaning and photovoltaic experts recommend a generous pre-wash with water to rinse the first coarse dirt. The water

runs through the soft brush and softens the stuck dirt. Then the microfibre cloth was fastened to the telescopic pole and with a gentle and slightly foaming detergent, which was dosed into the water stream, repeated the cleaning. To remove the soap residue, the entire surface was rinsed briefly with normal water. Since normal water often leaves lime spots and streaks that complicate the subsequent power consumption of solar cells, it is necessary in the final step to rinse with softened water the area again.

Simple installation and helpful equipment

Therefore acetic water from a commercial acetic cleaner was prepared using a LDT Dosatron Proportional Doser. In a very simple installation, the LDT Dosatron was connected to the garden water point with standard garden hose fittings. The dosing rate manually was set according to the specification of the acetic cleaner from 60 to 80 ml on 5 liter of water, here to 1.4 percent of the dosing adjustment. The suction hose with foot valve was inserted into the cleaner container and the tube of the telescopic lance connected to the doser. The water tap was now opened and I positioned myself, standing on the ladder on position. When the lance was opened and the water streamed out, the doser began to work immediately and feed the acetic



Simple installation of a Dosatron Proportional Doser. (Photo: Jens Voigt)

cleaner directly to the water. Low-calcium water now flushed over the entire surface of the solar system and left no stripes or stains on the glass during subsequent wiping. For the area of 15 square meter only used 250ml acetic cleaner.

The optical result was amazing and the next bill will show if the cleaning was successful. The recommendation is to clean a photovoltaic system at least once a year, depending on the location. The earnings by a system can be increased depending on location by 2 up to 7 percent.

Working without electricity

An important component of this system is a proportional dosing pump from LDT Dosiertechnik, which directly metered the detergent or any other dosing liquid, proportional to the amount of water, into the water flow. Connected to the water supply, the pump uses only the water pressure to operate. No electricity is needed.

The LDT Dosatron proportional dosing pump works with a volumetric hydraulic motor that provides continual injection of the liquid or soluble concentrate.

The concentrate for dosing is drawn in independently from the water supply and is mixed with the drive water. The dosing quantity always stays proportional to the water throughput, as per the manually adjusted dosing rate, even if there are flow or pressure fluctuations in the water supply system. Furthermore, the metering accuracy of the pump is not affected by piping lengths which simplifies its installation.

Operating principle

The proportional dosing system combines the functions of a water meter, dosing pump and mixer into a single unit with a design that does not allow for any dosing errors. Especially the continuous and immediate mixing in the mixing chamber of the doser provides a homogeneous and ready to use solution which can be used immediately, e.g. when applying a disinfectant and cleaning solution. The high dosing accuracy and reproducibility of +/- 3 percent (according to API675 standard) is an economic advantage for the operator, as higher concentrated media can be used. Due to the simple design of the proportional dosing



Cleaner using water-carrying telescopic pole. (Photo: Jens Voigt)

device with only a few components, the pump is very easy to maintain and easy to handle.

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