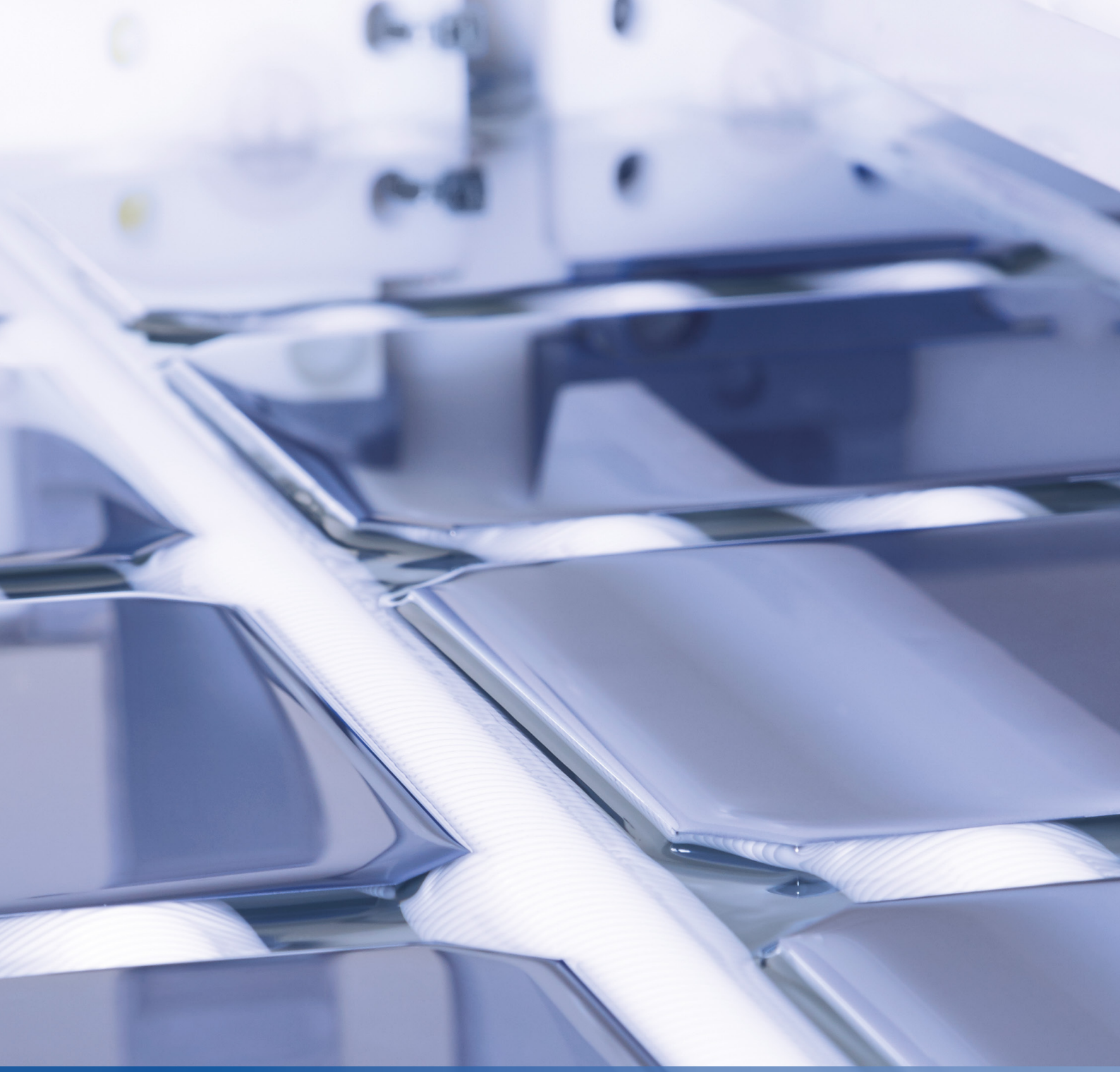


RENA TECHNOLOGIES GMBH

Security for aggressive processes

We make ideas flow.

bürkert
FLUID CONTROL SYSTEMS

Durable conductivity sensors for wet chemical surface treatment

THE COLLABORATION WITH RENA

Whether in wet-chemical plants where wafers are manufactured for solar cells or printed circuit boards are etched, or for electroplating processes — such production processes require the use of aggressive acids and alkalis. The sensors used must therefore meet special requirements, because common housing materials such as steel or stainless steel are not compatible with such aggressive substances and would be destroyed within a very short time. Ultrapure water also requires inert sensors to safely rule out contamination.
The solution is conductivity and flow measurement sensors whose housings are made of high-quality plastics such as PVDF or PP.

Did you know?

Thanks to the high-quality chemically inert plastic materials specially optimised for electroplating and wet-chemistry applications, the sensors* are ideally suited for use under aggressive environmental conditions.

Reliable sensors in robust plastic housings

RENA, based in the German town of Gütenbach in the Black Forest, has long been a specialist in machines and processes used in wet chemical surface treatment in solar, semiconductor and medical technologies. Its extensive and wide ranging products can be flexibly applied to diverse manufacturing processes. Functionality, reliability and safety play a decisive role in this. The wet-chemical inline and batch processes for solar cell production, for which RENA is the world market leader, are deployed around the globe and have been working reliably and safely for many years. This places high demands on the components used, for example on the sensors that are used for conductivity measurements in the distribution of demineralised water or for monitoring heat exchangers in the etching process. Wet chemical process downtimes, e.g. for unplanned sensor replacements, must be avoided under all circumstances. Therefore, the equipment manufacturers from the Black Forest region have been putting their trust in our sensor technology contained in robust plastic housings for many years. RENA uses several inductive and conductive conductivity sensors in its wet chemical surface treatment plants.

Monitoring mixing ratios and cooling water circuits

Inductive conductivity measurement is the method of choice for determining the concentration of acids and alkalis. An alternating current flowing in the primary coil (transmitter) generates an alternating magnetic field, which induces a current in the surrounding ionically conductive medium. The current flow in the medium generates a magnetic field that generates a voltage and thus a current flow in the secondary coil (consumer) of the sensor. This is a measure of the conductivity of the medium. Since the conductivity of liquids is also significantly dependent on temperature, an additional temperature sensor in the sensor continuously records the temperature of the medium. The temperature influence is compensated by the temperature coefficient (TK value) set in electronics assembly. Our type 8228

inductive conductivity meter then makes this measured value available to the controller as an fail-proof 4... 20 mA signal that can be easily transmitted over long distances in often very large systems.

These measuring devices perform two tasks in the

The inductive conductivity meter in the circulation circuit of an etching process. Source: RENA Technologies GmbH

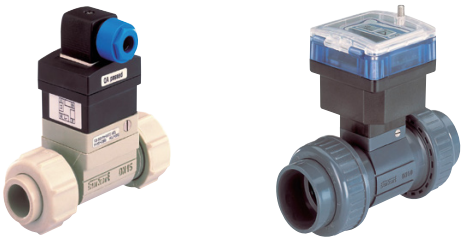
wet-chemical surface treatment plants: During etching processes they monitor the cooling water circuit. In the (rare) case of a hole forming in the heat exchanger, for example, twenty percent hydrofluoric acid would penetrate the secondary circuit. If such a case occurs, the conductivity sensors detect the change in concentration and report it to the controller, which automatically switches off the process and thus prevents consequential damage. Another task for the inductive conductivity meters is to monitor the concentration of alkaline textures. Here, the correct mixing ratios are decisive for the processing quality. The measuring devices operate in a wide measuring range of 100 µS/cm to 2 S/cm. The resolution is 0.1 µS/cm.

Conductivity measurement in demineralised water

Demineralised water, deionised water or water for injection is necessary for cleaning during wafer production. Its quality is also monitored in the wet chemical plants through conductivity measurement. Since the conductivity of this water is very low, the tasks are performed by type 8222 neutrino conductivity measuring devices. Their sensor consists of two electrodes in contact with media, along with a temperature sensor, and operates in a measuring range of 0.05 µS/cm to 10 mS/cm. The measurement signal is also processed directly in the sensor and transmitted to the controller as a 4... 20 mA signal that is insensitive to interference. The conductivity meters have proven themselves in many applications and RENA also relies on Bürkert solutions for other sensors that are required for wet chemical machining processes.

Precise flow measurement

The inline flowmeter type 8030 and the inline metering device type 8035 are often used for continuous measurements of media supply or leakage monitoring. Both consist of a compact sensor fitting with an impeller and a transmitter; the connection is quick and easy using a bayonet catch. The sensor fitting system we designed ensures easy installation of the devices in all pipelines. The sensors are suitable for flow velocities of 0.3 to 10 m/s, and their housings are also made of PVDF or glass fibre-free PP and are completely leak-proof. They are therefore also ideally suited for use in the aggressive environment of wet chemical plants or electroplating processes.



Inline flowmeters, e.g. type 8030 (left) or type 8035 (right), are used for continuous measurement of media feed or leakage monitoring..

Take advantage

of robust conductivity sensors:

Safe processes
Thanks to the durable plastic housing, the sensors are also suitable for use in aggressive ambient conditions.

Monitor seamlessly:
Conductivity sensors detect changes in concentration and report them to the controller, which automatically runs the process and thus prevents consequential damage.

High flexibility:
Various fittings, seals and nominal diameters allow for easy integration into different systems.

Simple commissioning:
The sensor fitting system ensures easy installation of the devices in all pipelines.

Source: RENA Technologies GmbH

RENA uses its wet chemical plants for surface treatment on several inductive and conductive conductivity sensors from Bürkert.

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