

## Reliable and efficient identification at all times

RFID technology from ifm in the global leader's PERC solar cell production facilities



### Our customer:

One of our customers is a global leader in the manufacture of high-efficiency monocrystalline PERC cells (Passivated Emitter and Rear Cell).

The company is regarded as a pioneer in the mass production of PERC cells. The production facilities have been enlarged in the course of major projects conducted in recent years. To improve production efficiency levels, state-of-the-art information technology has been implemented, including RFID for the identification of components during manufacturing.



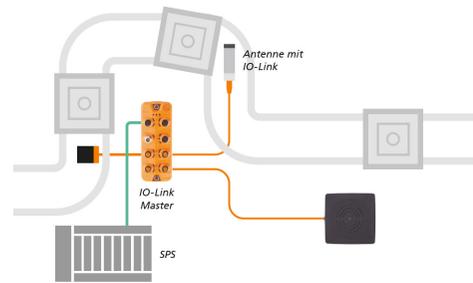
**The challenge:**

The planning for the new production facilities included the specification that each wafer should be reliably and individually identifiable while being processed by the various machines. Identification systems can contribute to intelligent manufacturing, and bring about sustainable improvements in productivity and efficiency, because unambiguous identification of the components reduces process errors. The data is read out and the information tells the production equipment which material is present and/or how it is to be processed further.

Machine-readable QR codes were used at first. However, this standard practice can cause production problems. If the two-dimensional code is sprayed directly onto the fragile silicon of the wafer this can cause damage. Alternatively, the QR code can be applied to the basket used to transport the wafer during production. However, the baskets are cleaned using water and acids after completion of the production process, and this often makes the QR code illegible.

**The solution – why ifm?**

When problems arose on account of illegible QR codes, our customer investigated other options. ifm was in a position to provide an alternative in the form of its RFID technology. A feasibility study very quickly demonstrated the consistency and reliability of the method for all stages of the cell production process. Consequently, type ANT421 RFID antennae were installed and connected to type DTE102/104 RFID evaluation units as a first step. Up to four antennae can be connected to each evaluation unit, which in turn is connected to superordinated systems via Ethernet/IP or TCP/IP.



When the production capacities were extended in a subsequent phase, ifm successfully tendered even more innovative solutions. These new facilities implement RFID solutions that are connected via IO-Link. The various production machines use type DTI421 and type DTI516 RFID read/write heads with an IO-Link interface. The IO-Link master modules are also supplied by ifm. Depending on the machine, a type AL1340 device for four IO-Link participants or a type AL1342 device for eight IO-Link participants are used. The new IO-Link solution provides the company with a very robust and resilient solution for industrial use. Compared with the complex Ethernet wiring of the code readers, IO-Link is more flexible and allows for faster system commissioning. Currently, ifm's RFID products are used for the following processes in the PERC cell production chain: substrate manufacture, diffusion, etching, annealing, PECVD and laser slot cutting.

**Results:**

- RFID also functions under difficult conditions
- Competent technical consulting from ifm
- Connection of the RFID read/write heads via IO-Link
- Flexible and quick set-up



Reliable detection



Robust



Quick set-up

