Automatic dosing system for the water quantity of a reverse osmosis system

The Proline Promass E 300 flow meter and the RA33 batch controller – A perfect match

Benefits at a glance

- Ensuring system accuracy of under 0.2%
- Automatic operation without manual intervention
- Improved stability and plannability of raw material use
- Reduced production plant downtime
- Seamless integration into the customer's digitization system
- Saving 50% of operating time per batch

Process conditions

- Media: RO Water (conductivity < 5uS)
- Ambient process environment temperature: 20 °C
- Flowrate: 4000 kg/h
- Pressure: 3 bar_g

The Proline Promass E 300 flow meter and RA33 batch controller automate reverse osmosis water dosing, achieving precise accuracy of under 0.2%. This automated solution replaces manual processes, reduces errors, minimizes downtime, and improves productivity and resource planning. Key upgrades include linear control valves for enhanced accuracy, integration with digitization systems, automated data storage and batch printing. The system ensures reliable, repeatable operation, meeting the high demands of pharmaceutical production.

Endress+Hauser

People for Process Automation

The challenge As an important raw material for pharmaceutical production processes, the precise dosing of reverse osmosis water is of fundamental importance. The previous manual dosing by operators and manual monitoring of the volume led to uncontrollable errors in the production process and waste of resources. The challenge was to automate this manual process in order to minimize the resulting downtimes of the plant. The new automated process was to increase system accuracy and guarantee a maximum deviation of 0.2%.

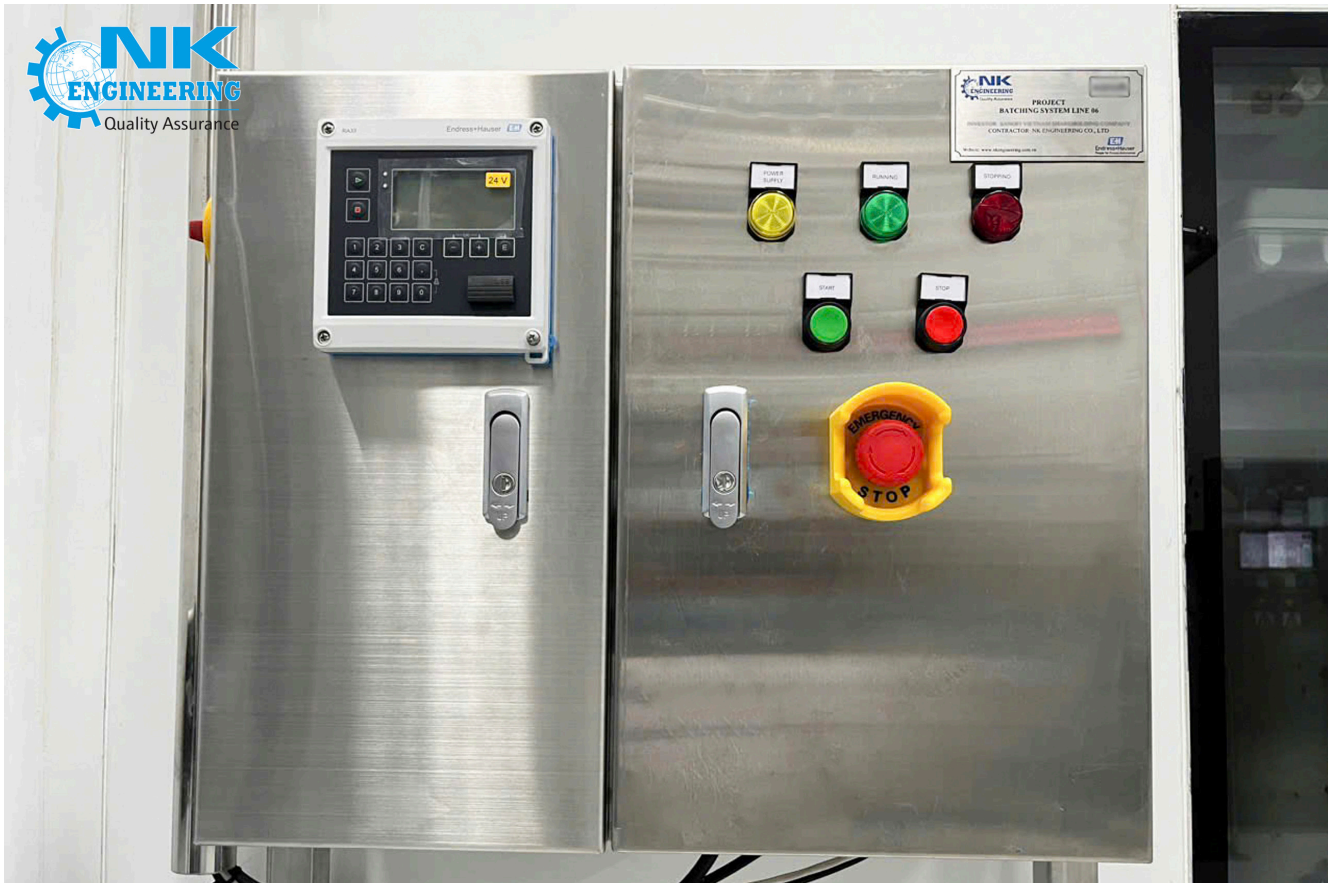
In addition, the time-consuming manual process should be speeded up by the automation in order to increase production capacities. In the previous process, operators had to add 600 kg of water in batches of 150 kg manually to the production tank to produce one batch of pure water, because the scale was limited to a maximum of 200 kg. This took them at least 25 to 30 minutes.

During commissioning, the repeatability of the system must be proven by repeatedly performing the test to ensure that the accuracy is always within the allowable range. In the subsequent process step, it was required to store these operating values securely in the customer's automation system for verifiability.

Our solution To overcome the challenges, the new automated process had to ensure system accuracy and data storage, as well as automate the entire dosing process. To achieve this, the operating process was completely recalculated and redesigned based on the characteristics of the Proline Promass E 300 flowmeter, the pumps, the valves and the RA33 batch controller.

The core of the optimized solution is to carry out the measurement of the reverse osmosis water using the Proline Promass E 300 instead of a load cell as before, and to automate the manual dosing control with the help of our RA33 batch controller and pneumatic valves. This automation of the system allowed the filling time of the production tank to be reduced from at least 25 to 30 minutes to 10 to 12 minutes. This corresponds to a reduction in operating time of 50% per batch.
As the medium in this process is pure water with low conductivity and high demands are placed on system accuracy, the Proline Promass E 300, with its accuracy of 0.15%, is the right device for this application. The batch controller RA33 ensures the system's intelligence and is able to reliably capture the data from the flow meter and, based on this, open or close the control valves. Setting the pulse coefficient to 0.02 kg/pulse reduces the susceptibility to errors to a minimum.

In addition, the conventional on/off valves in the operating process were replaced by 4-20 mA linear valves to increase the accuracy and flexibility of the system. Furthermore, an interface was created between the RA33 batch controller and a printer to automatically print the batch results after each process.



Components

- Proline Promass E 300 flow meter
- RA33 batch controller
- 4-20 mA linear valves

Result This smart solution from Endress+Hauser, which is precisely tailored to the requirements of the application, optimally automates the dosing system for the water volume of a reverse osmosis system. It helps customers to meet these challenges by increasing productivity as well as ensuring the stability and plannability of raw material consumption for the pharmaceutical production process.

In addition, the automation of the system can save 50% of the operating time per batch, thereby significantly increasing production capacities.

In the fourth quarter of 2022, Endress+Hauser installed this complete system in close cooperation with Representative NK Engineering in the Vietnamese plant of a major global customer in the pharmaceutical industry with great success. Later, this customer invested in another three similar Endress+Hauser systems due to the great benefits and savings of the first system.

RA33 batch controller

Proline Promass E 300 flow meter

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