

# DIGITAL DOSING™

## – Unique solutions for challenging dosing processes

Disinfection, neutralisation, precipitation and flocculation are essential physical and chemical processes of water treatment and wastewater recycling. Modern, highly efficient chemicals have to be used economically and with minimal impact on the environment. Some of these chemicals are very difficult to handle, and this overstrains conventional dosing pumps. These challenges can be met by digital dosing pumps with modern drive technology and control software.



DME 940

The chemistry in water treatment, water and wastewater recycling has experienced a huge development during the last 15 years, and this poses a challenge for today's dosing technology. Additionally, more and more complex applications require intelligent dosing pumps with new drives or new control and adjustment mechanisms to simplify the operators' job. This in turn ensures reliable, cost-effective, and high-precision processes.

Grundfos Alldos have accepted and met these challenges with the newly developed digital dosing pumps. These offer state-of-the-art drive technology and new dimensions of user-comfort, energy efficiency and dosing characteristics.

### 1. Higher requirements in control tasks and process reliability

With conventional dosing pumps, the dosing quantity can be adjusted by changing some parameters such as stroke rate and length, stroke volume and frequency. These factors have to be combined in the right way in order to get the right dosing performance. Furthermore, the adjustment range is usually limited. As a consequence, the correct pump type has to be selected for each single application. Increased control requirements, such as dosing in proportion to the volume via 4-20 mA or dosing control feedback to a central control

system, can only be realised with supplementary installations and accessories.

The new digital dosing pumps put an end to complex adjustments via stroke length and frequency. Stepper motors and EC drives with multi-sensor control circuits optimally fulfil the requirements due to variable, adjustable suction and dosing stroke speed. This unique feature ensures an optimal dosing characteristic and high precision even at a turndown ratio up to 1:1000. One of the Grundfos Alldos pump types easily achieves a flow range from 1.13 to 940 l/h.

Further integrated standard features of digital dosing are: manual adjustment of the required capacity in l/h, volume-proportional dosing via improved pulse or analogue control, and time- or pulse-controlled batch dosing.

Thanks to the wide flow range and flexible control options one single pump type can be used flexibly within one application. This keeps investment and maintenance costs at a low level.

The FlowMonitor and the Dosing Monitor detect – without any mechanically actuated parts – problems such as air-bubbles or sys-



DME 2-18

tem overpressure, and automatically display an error message. The latest development in this area is the AutoCal function, also based on pressure sensor technology. Now, even system pressure fluctuations have no influence on the dosing accuracy, as the motor speed is adjusted accordingly. This cost-effective solution increases the process reliability.

## 2. Precise dosing of highly concentrated chemicals to reduce both costs and environmental impact

The higher the concentration of the chemical, the more important is the dosing precision in order to reduce costs and environmental impact. Conventional dosing pumps fail through lacking precision. This can lead to over- or underdosing and to suction problems when dosing minimum volumes.

The very high precision of  $\pm 1\%$  is a result of a combination of factors: digital input of the dosing capacity without stroke adjustment, a calibration function to adjust the pump according to the properties of the dosing liquid, a positive crank drive of the diaphragm as well as an optimised dosing head and valve geometry. These are the key factors for environmentally friendly and cost-efficient dosing of chemicals.

## 3. Failure-free dosing of highly degassing chemicals

Dosing of degassing liquids usually results in an airlock in the head of conventional dosing pumps. Stoppages caused by gas bubbles result particularly from the heavily pulsating suction and dosing characteristics as well as the reduced stroke volume due to stroke length adjustment.

The new drive technology allows optimum control of suction and dosing stroke speed without changing the stroke length. The position of the diaphragm and therefore the volume flow are continuously controlled. The decisive advantage here is the fact that the suction phase is always performed with the full stroke volume.

The smaller the desired volumetric flow in relation to the maximum flow rate, the more continuous and smoother is the dosing characteristic, resulting in lower pulsation in the dosing system. This is very important to ensure smooth dosing of degassing liquids especially in installations that require long suction lines.

## 4. Reliable and precise dosing of viscous chemicals

Viscous polyelectrolytes are increasingly applied as flocculation additives in wastewater recycling processes. To avoid mixture gaps, it is essential that the dosing pump delivers precisely the required quantity into the process.

A combination of precise control of the suction speed, special valves, nominal widths and the positive drive of the dosing diaphragm enables proper handling and precise dosing of viscous media without the need for further gearing variants.

This is achieved by using the "Anti-Cavitation" or "Slow-Mode", which permits media with viscosities up to 3000 mPas to be dosed reliably with high precision. Especially the pump models between 60 l/h and 940 l/h are ideally suited for these applications.

## Conclusion

Grundfos Alldos took a big step forward in Digital Dosing™. With digital pump technology, the water utility business is well-equipped to meet the upcoming challenges.

The advantages at a glance:

- Precise, trouble-free and reliable dosing
- Energy-saving and cost-efficient
- User-friendly handling and operation
- Extensive control and monitoring functions
- High turndown ratio up to 1:1000
- Dosing capacities from 0.0025 to 940 l/h with only 9 models

Further information regarding Grundfos Alldos Digital Dosing™ pumps can be found at: [www.grundfosalldos.com](http://www.grundfosalldos.com)

### Relationship between stroke-frequency adjustment and capacity:

