

# Providing flush pumps with flow control

A case study from Emotron





**The flush pump system at the Lith drinking water production plant, a division of Brabant Water, recently underwent an overhaul. This system comprises two 55 kW centrifugal pumps driven by electric motors. They produce a combined output of 0 - 2000 m<sup>3</sup>/hour.**

Flush pumps are used to rinse filter beds clean. In fact, here is a brief description of what the whole process involves.

Groundwater is pumped through a number of well fields and collected in a pair of pipes. The water is then channelled to the filter station. Groundwater is rich in dissolved iron and manganese. The first stage of the purification process involves groundwater being intensively exposed to air. As a result of this, the dissolved metals are converted into insoluble flakes.

This aeration process also removes a number of gases from the water, which do not feature in drinking water. The second stage of the process involves catching the iron flakes in the upstream filter, a concrete tank filled with filter gravel. The water is passed through the gravel in this filter and the iron flakes are left behind. Once this first filter process is complete, the water is passed through a second gravel bed, which, this time, mainly catches the manganese particles. The water

which emerges from this downstream filter is then drinking water.

Both gravel beds become contaminated and must therefore be cleaned at regular intervals. This is done by blowing a volume of water upwards from under the gravel bed. The volume of water blown through the gravel bed is extremely critical, as this volume must be selected so that the gravel is just lifted up enough for the impurities to be rinsed away from it, but ensuring that the gravel does not swirl about.

Previously, Brabant Water only had the choice of operating 1 or 2 pumps and the volume of water was controlled by an electrical control valve, which was used to cut off any surplus volume. Unfortunately, this also produced a commensurate energy loss. In the new set-up, however, the pumps are started up using an Emotron FDU frequency inverter and an Emotron MSF softstarter respectively and are controlled by a pump control fully integrated in the frequency inverter. This means that the 0 to 2000 m<sup>3</sup>/hour range can be steplessly controlled. The volume of water required by Brabant Water is converted into a control value between 4 - 20 mA. The pump control compares this required value with the actual flow by feeding back a flow meas-

urement from the pipe and decides what the rotational speed of the first pump must be and whether the soft-starter for the 2nd pump motor must be switched on or off . During the commissioning phase, the control was even able to adapt without any problem to rapid adjustments to the required value.

Given that the pump control is fully integrated in the frequency inverter and that all the motor protection devices are integrated as standard in both the frequency inverter and softstarter, it was possible to convert the existing control cabinet using few additional components. Emotron supplied the mounting plate with the components already assembled on it, which meant that Brabant Water simply swapped the old mounting plate for the new one.

The Emotron pump control is suitable for nearly all processes where a number of pumps or fans (up to a maximum of 7) must automatically achieve and maintain a flow volume, pressure or other process values. Its standard features include continual process monitoring, automatically switching to another pump when there is a fault with the original pump and equally distributing the number of hours the pumps operate for. During operation, the incidences of sudden pressure and flow fluctuation affecting the frequency inverters and softstarters are added up and water hammer is prevented. In addition, there is no external PLC system required any longer, as the process used now can ease the load on the existing PLC system.

The pump control comprises an option card, which is inserted in the Emotron FDU frequency inverter and the settings automatically appear in the menu structure as soon as the card is inserted.

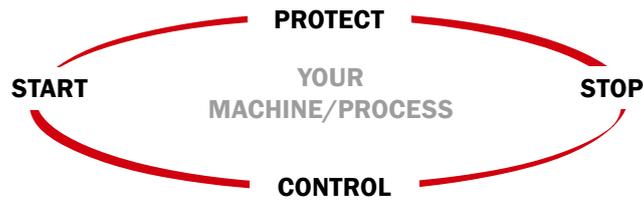
The additional investment is therefore so small that there is no need to purchase or programme any PLC beforehand.



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# A dedicated product portfolio



Emotron's product portfolio meets all levels of need for machines and processes driven by electrical motors. You will always find the optimum solution for your specific situation. When choosing Emotron, you will also benefit from cost-efficient installation and commissioning through built-in functionality that is

otherwise provided by additional equipment. You will also find intuitive user and process interfaces with the possibility of communicating critical parameters to other parts of your process, using analogue, digital, serial or fieldbus communication.



## PROTECT

### Emotron Shaft Power Monitors

when you wish to protect your application from over- and underload situations

## START • PROTECT • STOP



### Emotron Softstarters

when you wish to protect your application from over- and underload situations, as well as to optimize the start and stop sequences of your application

## START • PROTECT • CONTROL • STOP



### Emotron Variable Speed Drives Emotron Compact Drives

when you wish to protect your application from over- and underload situations, optimize the start and stop sequences of your application, as well as be in full control of your process values – flow, pressure, speed, torque, etc.



## Dedicated drive

Emotron focuses on solutions for starting, protecting, controlling and stopping machines and processes driven by electric motors. Our drive is to create measurable benefits for our customers and their customers to achieve their and our business goals, thus creating a win-win relationship for all parties involved with Emotron.

We have been developing our product portfolio during over 30 years towards carefully selected applications.

As a result we have built up specialist competence and can therefore offer our customers the optimum solution for their specific application needs.

Emotron is a Swedish company with manufacturing and development resources in Helsingborg, Sweden and in Bladel, the Netherlands. We have sales and service organisations in Sweden, Benelux and Germany, offices in China and Latin America, as well as a global network of distributors and service partners.



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