Optimize your pump operation

emotron®
DEDICATED DRIVE

Are you aware of

the possibilities?

- *Protection*
- *Reliability*
- *Control*
- *Cost-efficiency*

Pumps deserve to be protected from dry-running, cavitation and other unexpected situations that may cause unplanned stops and downtime.

Your pump investment deserves to be optimized so that you get the best return when it comes to total investment costs, energy consumption, maintenance costs, reliability and flexibility.

You also deserve to have full control of your pumps every single second from start to stop, so that you are the one who decides what should happen and when.

With more than 30 years of experience of controlling and protecting pumps, Emotron is at the forefront of the industry, offering know-how and products that enable you to get the most from your pumps.

Protection from da

Pump impellers damaged by cavitation can be avoided by using Emotron products.

mage and downtime

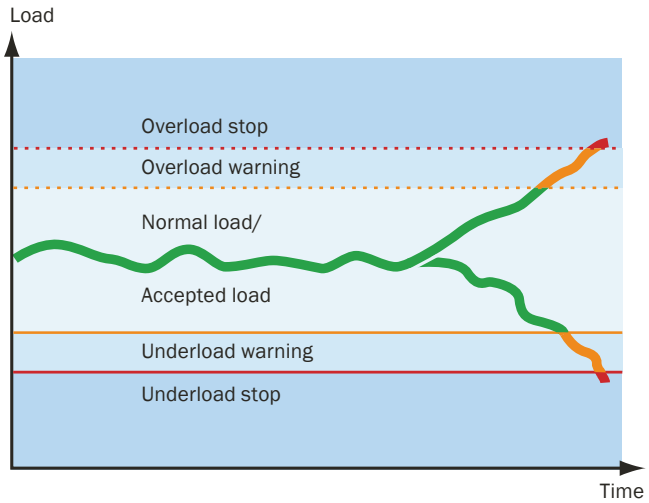
- *Protection from dry-running and cavitation*
- *Reliable and efficient operation*
- *Reduced downtime*
- *Early warnings and safety stops*

Did you know that you can automatically protect your pumps from the most common causes of pump damage and downtime? You no longer have to worry about dry-running, cavitation, overheating or blocked pipes and valves.

All Emotron products have a shaft power monitor that ensures smooth operation and prevents unnecessary downtime, energy loss, equipment wear and breakdown. If operation is not optimal or a problem occurs the monitor reacts immediately by sending out a warning or stopping the process. Early warnings allow preventive action – if a pipe is blocked, an impeller worn-out or a valve not fully opened.

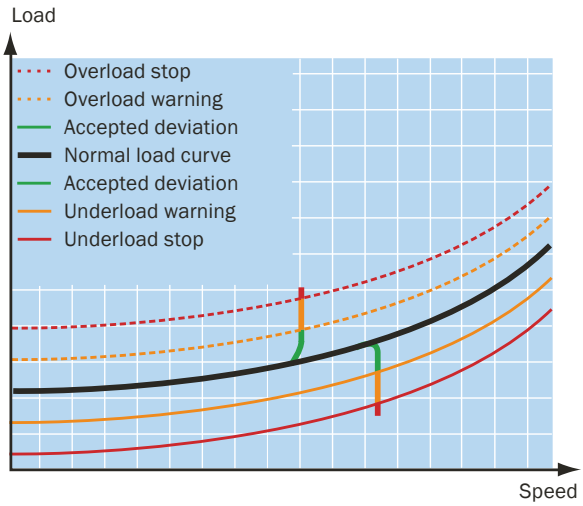
Emotron variable speed drive has a built-in shaft power monitor offering all the above advantages. In addition, it allows you to fully control and optimize operation. The variable speed drive quickly detects any deviation from the normal pump load curve, over the entire speed range. It is easy to set warning and stop levels to match your specific needs.

Protection for pumps running at full speed



Emotron softstarters and shaft power monitors offer protection from unnecessary downtime, energy loss and equipment damage. Warning and safety stop levels are easy to set.

Protection for pumps running at variable speed



Emotron variable speed drives adapt the pressure/flow to the level required. Deviations from normal operation are quickly detected over the whole speed range, thanks to the unique pump load curve protection (patent pending EP 05109356).

A soft start and

Smooth starts, safe operation and gentle stops. These irrigation pumps benefit from several Emotron softstarter advantages.

a smooth stop

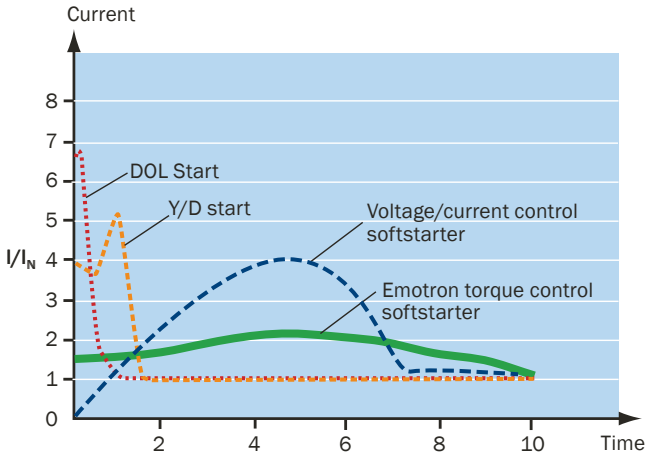
- *Low start currents give lower energy bills*
- *Linear stops eliminate water hammer*

Starting and stopping a pump may be easy, but the consequences may not always be the ones you wanted. It can result in high start currents that require large cables and fuses, resulting in high energy bills. Or hydraulic shocks known as “water hammer” can cause stress and damage to pipes, valves, gaskets and seals.

For pumps that operate at full flow, an Emotron softstarter offers a cost-efficient solution to these problems. Apart from pump protection, it provides start and stop control, preventing both water hammer and expensive high start currents. In addition, there is no need for costly motor-controlled valves that are often used to reduce pressure spikes at starts and stops.

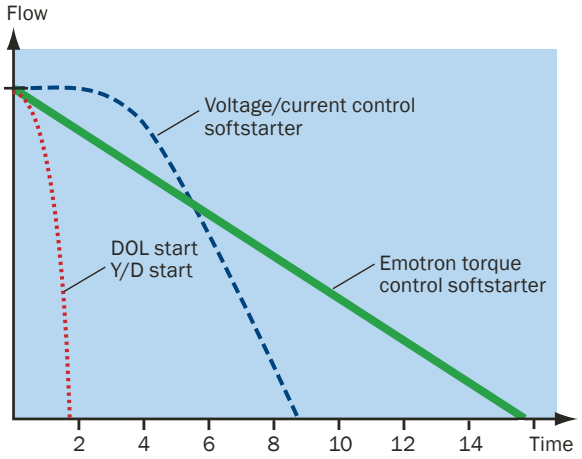
For pump systems that provide a variable flow or a constant pressure, the above challenges are most efficiently met by the use of an Emotron variable speed drive.

Low start currents give lower energy costs



The start currents are greatly reduced with Emotron softstarter, resulting in smaller fuses, cables and energy bills.

Linear stops eliminate water hammer



Unlike conventional softstarters, Emotron softstarter enables smooth and linear stops with no risk of water hammer, just like a motor-controlled valve or a variable speed drive – but at a lower cost.

Full control of pr

These cool water pumps at a printworks are used to ensure humidity is kept at the desired level.

essure and flow

- *Energy savings with variable speed*
- *Simple read-outs in the units of your process*
- *Robust IP54 housing for harsh environments*
- *Cost-saving control of up to seven pumps*

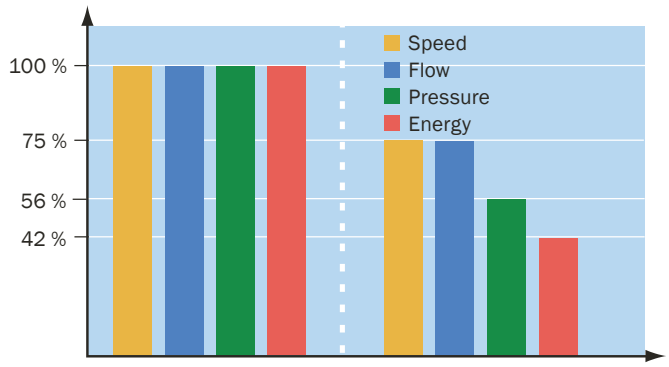
There are still many pump systems where the flow/pressure is controlled with valves. This corresponds to running a car on full throttle and regulating the speed using the brakes. Energy is wasted and the maintenance costs are high.

By using an Emotron variable speed drive to control your pumps, you benefit from considerable savings. The speed is automatically adapted to the desired flow or pressure, thus optimizing the energy consumption and minimizing the impact on surrounding equipment such as seals, impellers, pipes and valves. For example, reducing the speed of a centrifugal pump to 75% results in only 42% of the energy consumption. The lower the static pressure demand, the more profitable the speed control.

Emotron FDU is especially developed for pumps. It provides unique functions such as automatic pump rinsing. When a pump stands still or runs at low speed, sludge often sticks reducing efficiency. Using a timer, the pump can be set to run at full speed for a certain time, before returning to normal operation. This rinses out sludge and increases efficiency.

Operation parameters can be set in the units of your process (m^3/s, bar, Pa etc.). This makes it easier and safer to monitor your process. Other highly appreciated benefits of Emotron FDU are the robust steel IP54 housing and the multiple pump control functionality, with which up to seven pumps can be controlled without PLCs or other external equipment.

Variable speed drives reduce energy costs



Using Emotron variable speed drives to control the flow/pressure, instead of opening and closing valves, will help you to make considerable energy savings. This example shows savings from reducing the speed of a centrifugal pump to 75%.

Read-outs in the units of your process

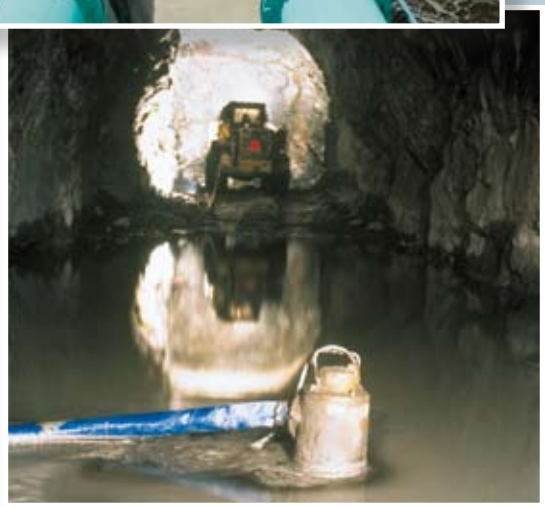
Your operation parameters can be set in units that are familiar to you and your process, like m^3/s, bar etc. No need to calculate what the figures really mean.

Application

Emotron has more than 30 years of experience of pump applications within water, wastewater, drainage, irrigation and industrial uses.

Our product portfolio, together with our experience, assure our customers a cost-efficient and fit-for-purpose pump solution.

examples



Pumps operatin

g at full speed

Emotron MSF softstarter

- *Soft start and stop*
- *Optimized operation*
- *Low installation cost*
- *Easy to install and use*

When this sewage treatment plant installed Emotron MSF softstarters, the result was considerable savings and more reliable operation. Unplanned downtime is no longer a problem and they benefit from reduced operation costs. The money saved in the first year alone paid for the investment.

Need to optimize process and reduce costs

Before installing the softstarters, valves were used to control the start and stop sequences. The pump operation needed to be optimized to increase the process efficiency. Another important goal was to reduce mechanical stress on the equipment in order to lower maintenance costs. The solution to these problems was the Emotron MSF softstarter.

Protects the pumps and enhances efficiency

Emotron MSF now protects the pumps from dry-running and cavitation. This has reduced maintenance costs and eliminated unplanned stops and downtime. The process is also optimized, thanks to the built-in shaft power monitor detecting any inefficiency caused by, for example, a worn-out pump impeller, a valve not fully opened or a blocked pipe. No energy is wasted and the operators can take care of the problem before damage is done. All this has resulted in higher process efficiency.

Less mechanical stress saves equipment

Stopping the pumps used to be a very critical moment. Emotron MSF softstarter now offers smooth and linear stop ramps with enough time to reduce pressure and then control the opening and closing of the valves. The mechanical stress on bearings, seals and impellers has been reduced and they no longer risk water hammer. The equipment lifetime is extended and the maintenance costs are reduced.

Reduced energy cost paid for the investment

The energy costs were reduced, not only thanks to the optimized operation; since the start current was reduced from sometimes up to five times the motor current to only about twice the motor current, the sewage treatment plant can now use smaller fuses and thereby benefit from lower energy costs. These savings paid for the softstarter investment in less than a year.

Variable flow or c

onstant pressure

Emotron FDU variable speed drive

- *Quick and easy set-up*
- *Energy savings*
- *Own process values*
- *Less maintenance*

In this example pumps are used at a chemical works. After installing Emotron FDU variable speed drives its process efficiency increased considerably. The energy savings alone meant the costs of the investment were recovered in less than a year.

Reduced energy and maintenance cost

For this chemical works, the challenge was to increase efficiency and reduce operating costs. In order to optimize the process Emotron FDU variable speed drives were installed. Regulating the flow/pressure with motor speed instead of using valves made the operation more efficient. The energy savings alone meant the costs of the investment were recovered in less than a year. Another result was reduced maintenance costs and extended equipment lifetime.

Quick and easy set-up

The pump functionality of the Emotron FDU made the set-up quick and easy. A lot of time was saved by using the copy function of the control panel. When settings had been made for the first variable speed drive they were easily copied to the other drives by removing the panel, attaching it to the next drive and transferring the settings.

With the PID function with auto tune it took only the push of a button for the Emotron FDU to sense the system and automatically set the required settings for the regulator.

Emotron FDU speaks their process language

The operators' work is made easier thanks to the Emotron FDU speaking their specific process language. Previously they had to convert data from the pressure sensor to the equivalent mA in the drive, then to speed/frequency and after that to bar and m^3/s – the process values they want to monitor. Using Emotron FDU they now obtain the data in their process language at all times. No confusion and no time spent on calculation, resulting in easier and safer monitoring.

Cost-saving IP54 housing

The cooling airflow for the Emotron FDU variable speed drive is completely separated from the drive electronics, which makes it withstand higher ambient temperatures and harsher environments. The robust IP54 steel housing made it possible to install the Emotron FDU close to the pumps. Doing so, avoided costly, long motor cables as well as the cost for fitting them into a cabinet.

Multiple pumps for

varying demands

Emotron FDU variable speed drive
Emotron MSF softstarters

- *Redundancy for reliable operation*
- *Controlled maintenance*
- *Energy savings*
- *Easy to install and use*

These pumps are used at a water purification plant. The objective is to keep a constant pressure in the process despite large variation in demands. This is achieved by controlling the pumps with an Emotron variable speed drive and four Emotron softstarters.

High efficiency despite variation in demand

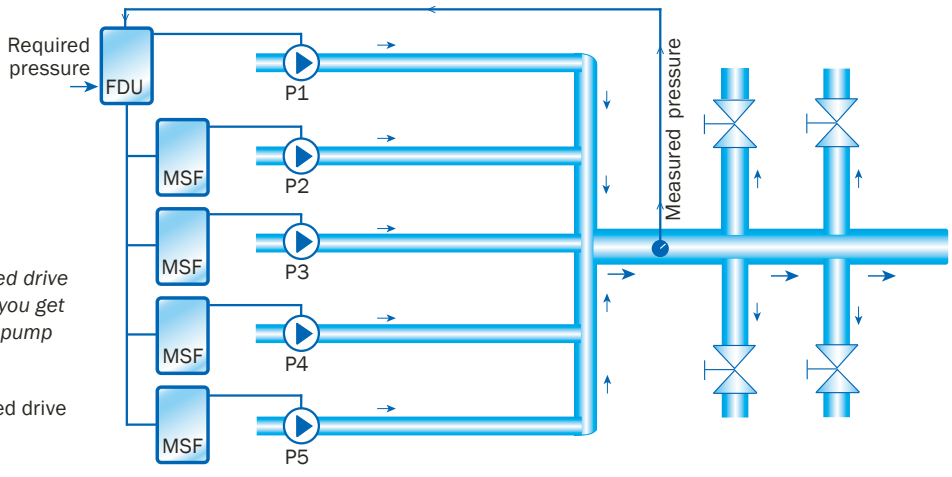
In this water purification plant the objective is to keep a constant pressure in the process despite large variation in demands during the day and night. To fulfil these variations, the pumps have to be controlled in order to work efficiently at all times. It is also important to protect the equipment from water hammer by ensuring soft starts and stops. All this is now achieved by controlling the pumps with Emotron products.

Cost-efficient master/slave solution

Using one Emotron FDU variable speed drive and four Emotron MSF softstarters has resulted in a very cost-efficient solution. The Emotron FDU controls all five pumps without external PLCs. It works as the master and gives feedback of measured pressure to the internal PID regulator. When the master pump reaches its capacity limit, the Emotron FDU sends a signal to an Emotron MSF softstarter to smoothly start the next pump. By keeping track of how long each pump has been running, the Emotron FDU gives them all an equal running time and thereby simplifies servicing.

Soft stops and redundancy for reliable operation

The Emotron FDU continuously adjusts the pressure and minimizes energy consumption. When the demands decrease, the pumps are stopped smoothly with Emotron MSF without any water hammer. The one stopped first is the one with the longest running time. If there is a problem with a pump or motor the system automatically switches over to next pump in turn, avoiding unnecessary downtime.



With Emotron FDU variable speed drive and Emotron MSF softstarters, you get the most cost-efficient multiple pump control system.

FDU: Emotron FDU variable speed drive
MSF: Emotron MSF softstarter
P1 - P5: Pump with motor

Communicating your process

All Emotron products provide support for analogue, digital, serial and fieldbus communication. The read-out can be set in the values of your own process, eliminating the need to calculate what the figures really mean.

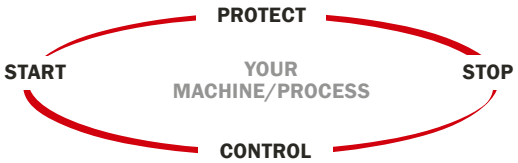
All Emotron products enable communication of critical parameters between the control devices involved in a process and with for example a control room. The read-out can be set in the values of your own process, eliminating the need to calculate what the figures really mean. Emotron provides the following communication options:

- Fieldbus (Profibus, DeviceNet, Ethernet)
- Serial communication (RS232, RS485, Modbus)
- Analogue and digital outputs

Several process values and system parameters are made available via the communication interfaces, including current, voltage, power factor, shaft power, shaft torque, energy consumption and operating time. These values and parameters can be used in your control system to achieve optimal performance at minimal cost. You will not only be warned when something is wrong, you will get a complete data log that helps you to quickly spot the fault, thereby simplifying maintenance.

You will also be alerted if your process is not running at optimal speed. Perhaps a pipe is blocked or a valve not fully opened? This is detected immediately, allowing you to take the necessary measures to achieve a smoothly running process.

Products for your specific needs



Our complete product portfolio offers optimum solutions for your specific needs. The products are all based on the same technology platform and can easily be integrated in complete solutions. Wide power range, high protection class and compliance with global standards mean they fulfil the highest demands.

- *Shaft power monitors* – protect your process from damage and unplanned downtime.
- *Softstarters* – ensure smooth starts and safe stops.
- *Variable speed drives* – minimize energy consumption and wear.

Dedicated Drive

Emotron develops products for starting, protecting, controlling and stopping machines and processes driven by electric motors. Our drive is to create measurable benefits for our customers through reliable, cost-efficient and user-friendly solutions. By focusing on selected applications, such as pumps, cranes and lifts, we can offer functionality optimized for specific needs.

Since 1975 we have established a solid position as an innovative and pioneering company. Research and development takes place at our head office in Sweden and at our subsidiaries in Germany and the Netherlands. Germany is also the location for the Emotron technical centres for lift and crane solutions. We have sales offices in Sweden, Germany, the Netherlands, China and Latin America, as well as a worldwide network of authorized service partners.

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Emotron AB 01-3671-01 2008-05-14