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Protect your process against damage and downtime



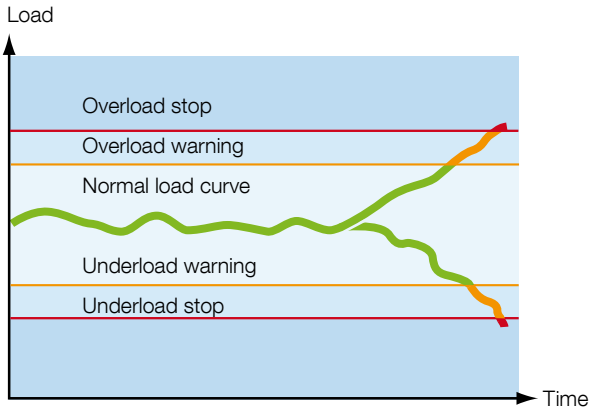
Emotron M20 Shaft power monitor



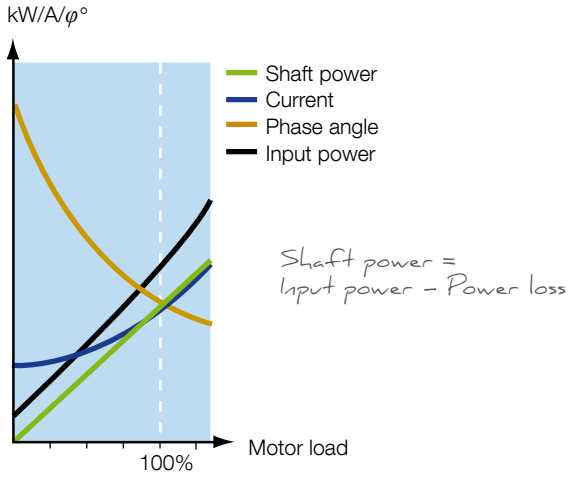
Your insurance against damage and downtime

Emotron M20 shaft power monitor helps you save time and money. It protects your pumps or other applications against damage and detects process inefficiency. Early warnings allow you to take preventive action. Unique features include measuring shaft power output and using the motor as a sensor. The result is reduced maintenance and installation costs, extended equipment lifetime and increased reliability.





Emotron M20 shaft power monitor protects your equipment and process against damage and downtime. Early warnings and stops allow preventive action.



Calculating shaft power gives more reliable supervision than non-linear techniques. Both current measurement and phase angle are used, resulting in an accurate load value for high as well as for low load levels.

Preventive action saves time and money

You can't afford not to protect your pumps or other applications with Emotron M20. The shaft power monitor offers reliable insurance against process failure and its costly consequences. By immediately initiating a warning or stopping the process, the monitor minimizes production downtime, prevents equipment damage and eliminates unnecessary wear. Preventive maintenance instead of repairing or replacing damaged equipment saves time and money. Payback time is short, in many cases negligible considering the cost of one single production stop. Is it a question of hours, days or weeks at your plant?

Unique shaft power monitoring

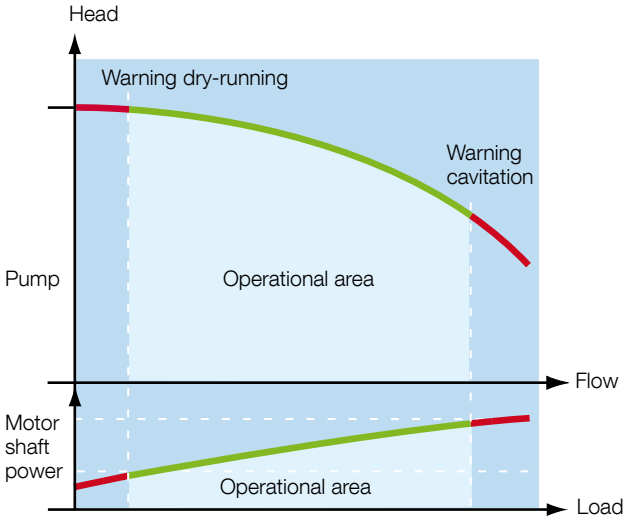
The Emotron M20 uses a unique technique to monitor motor shaft power. The result is an accurate and linear motor load value across the whole load range. The shaft power output is calculated by measuring motor input power, sometimes called true power, and subtracting the motor power loss calculated using a unique and precise principle. The shaft power output is indicated on the monitor display in kW or hp, or as a percentage of rated power. Both current measurement and phase angle are used in order to calculate an accurate load value for high as well as for low load levels. This gives more reliable supervision than non-linear methods. A system using current measurement alone, would detect load variations only at high motor loads.

Direct correlation to the pump curve

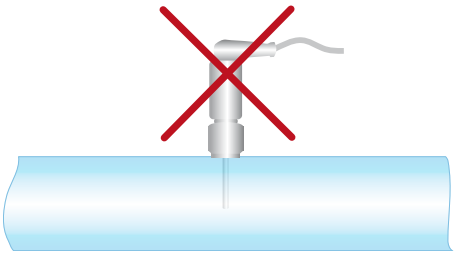
When over- or underload situations occur due to, for example, a pump running dry or cavitating, this produces corresponding changes in motor load and shaft power. The Emotron M20 immediately detects the load change and sends a warning or stops the pump, thus preventing damage and downtime. You can easily set the maximum and minimum load levels for pump and motor according to the requirements of your specific application. Unlike other measuring techniques, motor shaft power output signal can be used directly by pump technicians and mechanical engineers. It is a well-known term related to mechanical equipment and processes, and has a direct correlation to the pump curve.

Uses motor as a sensor

The unique technique of the Emotron M20 is as simple as it is ingenious – it uses the drive motor as its own sensor. This increases reliability and cuts investment, installation and maintenance costs. The monitor is typically installed within the motor's electrical control panel or cabinet, thereby ensuring minimal wiring and installation time. You need no mechanical load protection devices, external sensors or extra cabling, and nor do you need to make any holes in pipes or mount brackets. Operational status is continuously measured and the monitor sends a warning and/or shuts off the motor and the driven equipment at your pre-set load levels.



In this example the Emotron M20 protects a centrifugal pump by monitoring the motor shaft power. The result is an immediate warning or stop if the pump is at risk of running dry or cavitating. The technique has a direct correlation to the pump curve.



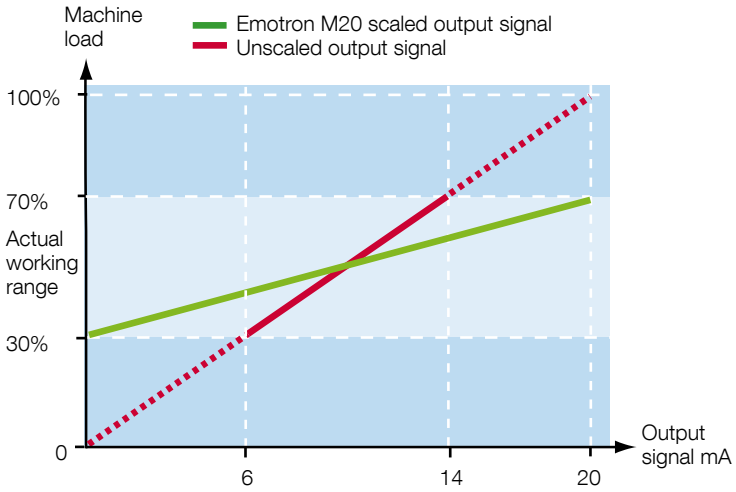
The Emotron M20 uses the motor as its own sensor. No external sensors or extra cabling are required, and nor do any holes need to be made in pipes. The result is reduced installation and maintenance costs.



Higher reliability and reduced costs

Higher accuracy with scalable output signal

The Emotron M20 has a unique feature that also offers higher accuracy and more reliable monitoring in the event of very small process and load variations. The analogue output current signal can be scaled to match the actual working range of the machine load. You can let the minimum and maximum motor load levels (P-span) represent, for example, idling and full load of your driven machine. The result is an output signal proportional to the machine load. The signal can be used as an input to indicating instruments, controllers or PLCs. The analogue output and two relay outputs also allow you to combine direct and indirect control. For example, the Emotron M20 can stop a pump directly if it is at risk of running dry, and at the same time also continuously indicate the pump load in real time.



The Emotron M20 offers high accuracy, also in the event of very small load variations. The analogue output current signal can be scaled to match the actual working range of the machine load.

Enter your settings in three seconds

You easily set the warning and stop levels according to the requirements of your specific application. The Emotron M20 uses a unique Auto set feature that allows four protection set points to be established in just three seconds with the push of a single key. By pressing Auto set during normal operation, the warning and stop levels are calculated automatically on the basis of the actual motor load measured.

Low-cost installation and zero maintenance

The Emotron M20 offers low-cost installation. The compact units are easily mounted next to the motor contactor in the electric control panel and they directly monitor the motor via a matched current transformer. External transmitters are not required and wiring is minimized. In pump applications, the monitor replaces expensive and service-demanding components such as flow, pressure and temperature sensors. In conveyor applications, no safety clutches, limit switches or shear pins are required. And you do not need to drill holes in pipes or mount brackets to fit the components. This significantly reduces installation time and cost. Other Emotron M20 benefits are high reliability and low maintenance costs since the monitor is a solid-state device with no moving parts and it can be installed away from hostile operating areas. Sensorless monitoring also eliminates the need for cleaning and mechanical adjustment of sensors.







Protection to meet your needs

APPLICATION	CHALLENGE	EMOTRON M20 SOLUTION	VALUE
Pumps in general	Dry-running, cavitation and other pump failure.	Detects over- and underload. Sends warning or stops the pump.	Increased reliability. Reduced maintenance costs. Extended equipment lifetime.
	Inefficiency due to low flow, a closed valve, a blocked pipe or impeller etc.	Detects over- and underload. Sends warning or stops the pump.	Optimized operation. Increased reliability. Reduced equipment wear.
	Mechanical flow switches and temperature sensors are expensive and fail frequently.	Using pump motor as sensor eliminates need for external sensors. No moving parts increases reliability.	Increased reliability. Reduced maintenance, investment and installation costs. Extended equipment lifetime.
	Temperature sensors and flow switches do not register dry-running or no-flow during low load conditions.	Detects over- and underload in low load range. Using pump motor as sensor eliminates need for external sensors.	Increased reliability. Reduced maintenance and installation costs. Extended equipment lifetime.
	Sensors need cleaning and mechanical adjustment.	Using pump motor as sensor eliminates need for external sensors.	Reduced maintenance and installation costs. Easy installation and set up.
Centrifugal pumps	Frequent dry-running causes damage and downtime.	Shuts pump off before it runs dry.	Reduced maintenance costs. Less downtime.
Magnetic pumps	Current monitoring is unreliable. Underload is not detected in low load range.	Detects underload in low load range.	Increased reliability. Reduced maintenance costs. Less downtime.
	Motor running without driving the pump is not detected.	Registers lower motor load and detects that motor does not drive the pump.	Increased reliability. Preventive action reduces damage and downtime.
Screw and impeller pumps	Dry-running is detected too late. Sensors do not register short period of lower motor load as remaining liquid still lubricates the pump.	Detects short period of lower motor load. Sends warning or stops the pump.	Reduced maintenance costs. Extended equipment lifetime. Less downtime.





APPLICATION	CHALLENGE	EMOTRON M20 SOLUTION	VALUE
Mixers	Mixer blade is damaged or has fallen off.	Detects over- and underload. Sends warning or stops the mixer.	Optimized operation.
	Difficult to determine when viscosity is right.	Controls viscosity according to motor load using the analogue output.	Optimized operation. Improved product quality.
	Shaft oscillation occurs.	Detects abnormal load variations. Sends warning or stops the mixer.	Reduced maintenance costs and downtime.
Scrapers	Jamming occurs.	Detects overload. Sends warning or stops the scraper.	Reduced maintenance costs and downtime.
	Scraper blade is damaged or has fallen off.	Detects over- and underload. Sends warning or stops the scraper.	Optimized operation.
Conveyor systems, crushers etc.	Jamming occurs.	Detects overload. Sends warning or stops the process.	Reduced maintenance costs and downtime.
	Material runs out, causing unnecessary idling.	Detects underload. Sends warning or stops the process.	Optimized operation.

TECHNICAL DATA

The Emotron M20 shaft power monitor offers advanced multi-function monitoring thanks to two output relays, an analogue output and a display for load indication and parameter settings.

Supply voltage	100-240 VAC / 380-500 VAC / 525-690 VAC
Frequency	50 Hz / 60 Hz
Rated current	Up to 999 A via current transformer
Protection class	IP20
Approvals	CE, UL, cUL

For further technical information, please see the Emotron M20 data sheet.

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