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Small in size – large in functionality



Emotron VSA/VSC Variable Speed Drive

emotron®
DEDICATED DRIVE

Smooth and effi

Although small in size, the Emotron VSA/VSC variable speed drive is equipped with several advanced features. It offers great flexibility in all senses. Functionality is easily adapted to your specific application requirements. The compact format offers flexible installation and the user-friendly set-up will have your system up and running in no time.

Emotron VSA/VSC offers reliable and cost-efficient operation of your pumps, fans, compressors, mixers and cranes. The complete series covers motors in the power range of 0.18 - 7.5 kW.



cient operation

Soft and efficient starts
Emotron VSA/VSC offers efficient yet soft starts that protect your equipment. Reduced start currents result in smaller fuses, cables and energy bills. You easily start a mixer filled with material using torque boost to overcome initial peak loads. A heavily loaded crane is safely started without jerks causing swinging load.
A turned-off fan that is rotating in the wrong direction due to draught is handled safely using spin start. Mechanical stress is reduced, equipment lifetime extended and cycle time minimized.

Quick and safe braking
Controlled stops are ensured by Emotron VSA/VSC. In pump applications, this eliminates the risk of water hammer and other costly damage. In addition, you no longer need expensive motor-controlled valves to reduce pressure spikes. The result is reduced installation, energy and maintenance costs.

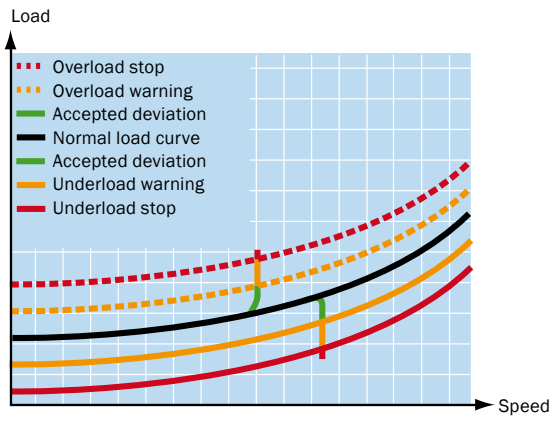
Advanced braking functionality offers quick and precise stops without mechanical brakes, for example in mixer operation. In crane applications, rapid but soft braking without jerky movements is ensured.

Protection from damage and downtime
Efficient built-in protection allows you to take preventive action that minimizes damage and downtime. Emotron VSA immediately detects any over- or underload situation – if a fan filter is blocked, a pump is running dry, a mixer blade is damaged or a compressor is idling. This is done thanks to a unique built-in shaft power monitor.

Overheating, momentary power loss or a locked rotor are other situations that initiate a warning or a safety stop. The result is optimized operation and reduced maintenance costs.

Reliable operation without interruption
Emotron VSA/VSC offers a low voltage over-ride function that protects your process from interruptions due to momentary main power supply failure. The result is more reliable operation.

Auto reset after alarm means the Emotron VSA/VSC automatically restarts the motor after safety stops due to, for example, under voltage, overload or overheating. This saves time since no manual intervention is required.



Emotron VSA protects your process against damage and inefficiency by sending a warning or stopping the process at your chosen load levels.



Flexibility in



all senses

Emotron VSA/VSC offers high reliability and great flexibility. Functionality is easily adapted to your specific application to ensure optimized operation at all times.

Minimized energy consumption and wear
Controlling your pump, fan and other equipment with a variable speed drive means considerable savings compared to opening and closing valves or dampers. Emotron VSA/VSC has a built-in PID regulator that continuously adapts motor speed to the level required. This minimizes energy consumption and equipment wear.

A built-in sleep function helps to further save energy and maintenance costs by lowering the motor speed to zero when it does not need to be run in order to keep up the required pressure. The motor is restarted when the need occurs again.

Emotron VSA/VSC also has a temperature controlled cooling fan that operates only when required, thus reducing energy consumption and extending equipment lifetime.

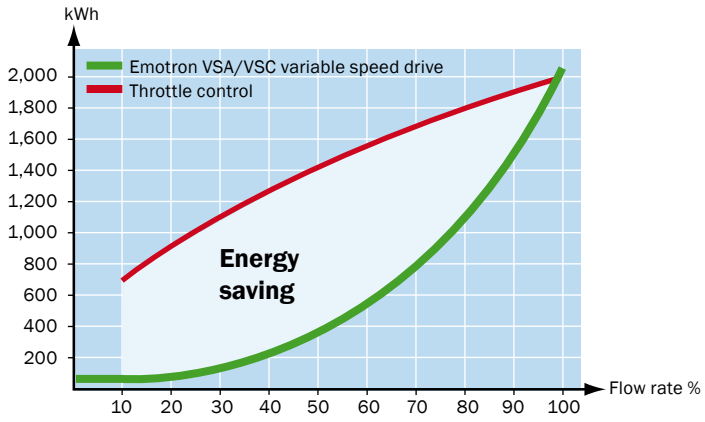
Flexible speed control
Emotron VSA/VSC offers eight programmable pre-set speeds, which makes it easy for the operator to select the correct speed setting in each situation. One example is a mixing application, where different speeds are set for handling material with different viscosity. Thanks to a built-in motor potentiometer the operator can also control speed using two keys on the control panel for up and down respectively.

The variable speed drive easily handles load types that require different settings. This offers optimized control in all applications, using for example constant torque for mixers and square torque for pumps and fans. A built-in potentiometer also offers quick and easy adjustments of rotation speed during commissioning. No cabling is required, which facilitates work.

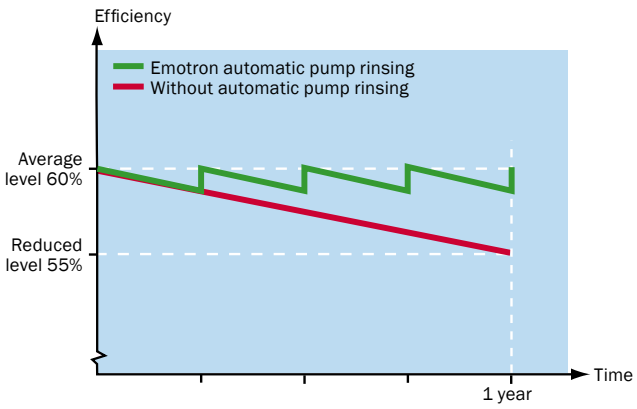
Protection through speed control
Flexible speed control allows you to prevent equipment damage and save on maintenance costs. You can set different speed ranges to be skipped. This is valuable in, for example, fan applications in order to eliminate vibrations by quickly passing known resonance frequencies.

To avoid friction in pump applications, double speed ramps can be set. In the case of Emotron VSC, both ramps can also be adjusted to be linear or S-shaped. One ramp is set to control the pump from zero speed and up to the minimum speed limit, and the other ramp is set for normal operation.

Automatic pump rinsing increases efficiency
Emotron VSC can be set for automatic pump rinsing using a timer. When a pump has been running at low speed or been stationary for a while, sludge often sticks to the impeller. Emotron VSC allows you to set the pump to run at full speed for certain intervals or for a certain time at start-up, before returning to normal operation. This cleans the pump and pipes and increases efficiency.



Speed control offers considerable energy savings. In this pump application, energy consumption is reduced by up to 50% compared to throttling valves. Calculation is made using Emotron Energy Saving Calculator and assumes a 2.2 kW motor.



Emotron VSC offers automatic pump rinsing. In this example, a centrifugal pump at a sewage treatment plant is set to run at full speed for certain intervals to rinse out sludge, thereby increasing efficiency.

Functionality optimize





Pumps

Challenge	Emotron VSA/VSC solution	Value
Water hammer damages the pump when stopped. Mechanical stress on pipes, valves, gaskets, seals.	Smooth linear stops protect the equipment. Eliminates need for costly motorized valves.	Reduced maintenance costs and less downtime. Extended equipment lifetime. Lower installation costs.
Dry-running, cavitation and overheating damage the pump and cause downtime.	Protection function detects deviation. Sends warning or activates safety stop.	Preventive action before damage. Extended equipment lifetime and reduced downtime.
Sludge sticks to impeller when pump has been running at low speed or been stationary for a while. Reduces the pump's efficiency.	Automatic pump rinsing. Pump is set to run at full speed for a certain time before returning to normal speed.	Higher process efficiency and reduced maintenance costs.
Motor runs at same speed despite varying demands in pressure/flow. Energy is lost and equipment stressed.	PID function continuously adapts speed to the level required. Sleep function can be activated when motor does not need to be run.	Optimized energy consumption and increased efficiency. Reduced maintenance costs.
Process inefficiency due to e.g. a blocked pipe, a valve not fully opened or a worn impeller.	Protection function quickly detects deviation from normal load. Warning is sent or safety stop activated.	Optimized operation. Preventive action before damage. No energy is lost and downtime is reduced.

d for your application

Fans

Challenge	Emotron VSA/VSC solution	Value
Draught causes turned-off fan to rotate the wrong way. High current peaks and mechanical stress when starting. Can result in blown fuses and breakdown.	Spin start ensures that the motor is picked up at its present speed and direction, gradually slowed to zero speed and then started in the right direction.	Reduced cycle times. Extended equipment lifetime and less downtime.
Regulating pressure/flow with dampers causes high energy consumption and equipment wear.	Automatic regulation of pressure/ flow with motor speed gives more precise control.	Optimized energy consumption and minimized impact on equipment.
Motor runs at same speed despite varying demands in pressure/flow. Energy is lost and equipment stressed.	PID function continuously adapts speed to the level required. Sleep function can be activated when motor does not need to be run.	Optimized energy consumption and increased efficiency. Reduced maintenance costs.
Process inefficiency due to e.g. a blocked filter, a damper not fully opened or a broken belt.	Protection function quickly detects deviation from normal load. Warning is sent or safety stop activated.	Optimized operation. Preventive action before damage is done. No energy is lost and downtime is reduced.

Compressors

Challenge	Emotron VSA/VSC solution	Value
Compressor is damaged when cooling agent enters the compressor screw.	Overload situation is quickly detected and safety stop can be activated to avoid breakdown.	Extended equipment lifetime. Reduced maintenance costs and less downtime.
Pressure is higher than needed, causing leaks, stress on the equip-ment and excessive air use.	Protection function detects deviation. Warning is sent or safety stop activated.	Preventive action before damage or breakdown. No energy is lost and downtime is reduced.
Motor runs at same speed when no air is compressed. Energy is lost and equipment stressed.	PID function continuously adapts speed to the level required. Sleep function can be activated when motor does not need to be run.	Optimized energy consumption and increased efficiency. Reduced maintenance costs.
Process inefficiency and energy wasted due to e.g. the compressor idling.	Protection function quickly detects deviation from normal load. Warning is sent or safety stop activated.	Optimized operation. Preventive action before damage is done. No energy is lost and downtime is reduced.

Functionality optimized for your application

Mixers

Challenge	Emotron VSA/VSC solution	Value
High load when starting mixer loaded with material.	Torque boost overcomes initial torque peak.	Reduced maintenance costs and more efficient operation.
Quick stops are required for safety and/or productivity reasons.	Built-in braking transistor and adjustable DC braking offers quick braking. No need for mechanical brakes.	Increased safety and productivity. Reduced maintenance and installation costs.
Difficult to determine when mixing process is ready.	Built-in shaft power monitor determines when viscosity is right.	Optimized operation and higher product quality.
Process inefficiency due to e.g. a damaged blade. Energy wasted, mechanical stress and risk of process failure.	Protection function quickly detects deviation from normal load. Warning is sent or safety stop activated.	Preventive action before damage or breakdown. No energy is lost and downtime is reduced.

Cranes

Challenge	Emotron VSA/VSC solution	Value
Starting with a heavy load is difficult and risky. Can lead to jerks causing swinging load.	Torque control and precise speed control gives instant yet soft start with heavy load.	Shortened cycle time and increased safety. Less stress on equipment. Reduced maintenance and downtime.
Braking with heavy load is difficult and risky. Can lead to jerks causing swinging load.	Torque control and DC braking gradually reduce speed to zero before mechanical brake is activated.	Increased safety. Less stress on equipment. Reduced maintenance and downtime.
Unsynchronized riding of railbound crane causes noisy operation and stress on wheels.	Speed of wheels is fully synchronized. Crane rides parallel to the rail.	Reduced maintenance and downtime. Less noise improves working conditions.



Flexible installation and easy set-up



The compact format of Emotron VSA/VSC offers flexible and cost-efficient installation.
The user-friendly set-up will have your system up and running in no time.

Control panel – built-in and external
Emotron VSA/VSC has a built-in control panel used to set programmable functions and operate speed, start and stop. Several process parameters can be shown on the display.

The control panel of the Emotron VSC is removable to allow external mounting on a cabinet front or control stand. An external control panel is available for the Emotron VSA, offering the same benefit.

Flexible configuration
Digital inputs can be controlled directly from any PLC via +24 V DC signals. Both NPN and PNP connections are supported. This offers great flexibility when installing and configuring the system.

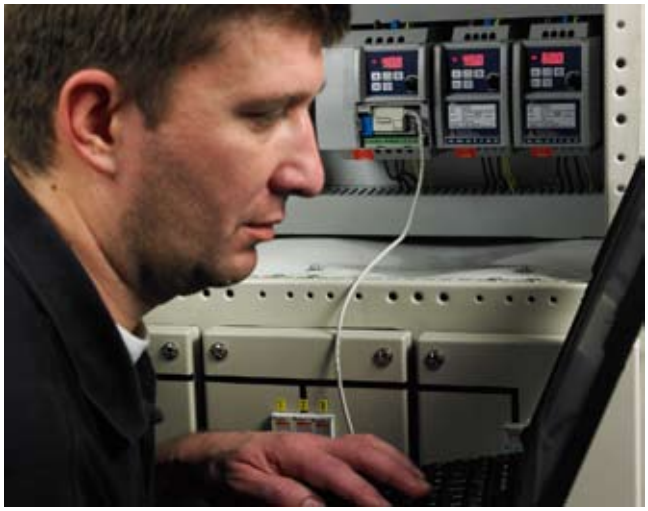
User-friendly software
Parameter settings are easily made using the Windows-based software Emotron DriveLink. The software is also used for monitoring of the operational status, for program back-up, printing of alarm reports etc.

Side-by-side saves space
Compact format means the Emotron VSA/VSC units are easily fitted into cabinets. Further space is saved through side-by-side installation. This is possible thanks to the ventilation air being let out upwards. The free choice of DIN-rail or screw installation offers great flexibility.

Extensive EMC protection
All Emotron VSA/VSC units have built-in 1st environment EMC filter as standard. This offers efficient protection and minimizes the cost of and space required for installation. The units with 1-phase supply voltage comply with unrestricted distribution, while 3-phase units comply with restricted distribution.

Extended functionality with options

The functionality of Emotron VSA/VSC can be customized according to your needs thanks to a number of options.



Communicate your process
Emotron VSA/VSC can be supplied with a module for serial communication via RS232, RS485 and Modbus RTU. Fieldbus communication is also available via Profibus.



External control panel
Emotron VSA can be completed with an external control panel for mounting on a cabinet front or control stand. The Emotron VSC control panel is removable, offering the same possibility.



Easy copying of settings
A copy unit is available for easy transfer of settings between Emotron VSA units or Emotron VSC units. This saves time and ensures that the units have exactly the same settings.



Expanded functionality
An expansion board with two digital inputs and one digital output can be connected to increase the number of I/Os available.

Compact in all sizes



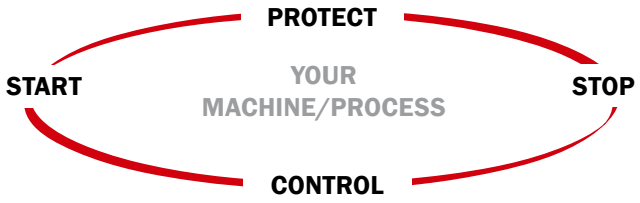
Technical data

Emotron VSA/VSC variable speed drive is available in the following range:

	Emotron VSA *1-phase*	**Emotron VSA** *3-phase*	**Emotron VSC** *3-phase*
Rated power	0.18-2.2 kW	0.75-2.2 kW	4-7.5 kW
Supply voltage	200-240 V	380-480 V	380-480 V
Rated current	1.7-10.5 A	2.3-5.2 A	8.8-17.5 A
Protection class	IP20	IP20	IP20
Approvals	CE, UL	CE, UL	CE, UL

For further technical information, please see the Emotron VSA/VSC data sheet.

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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