



SC Industrial Syndicate

Starts, stops and protects

Emotron TSA – Softstarter





First in a new line of CG high performance softstarters

Emotron TSA softstarters take motor control to a new level. Soft torque starting, intelligent load monitoring and smart stops are all included and accompanied by a robust and compact design. By developing the Emotron TSA range of electronic softstarters CG has taken a major step towards the ideal motor controller for applications where variable speed is not required. You simply get everything except variable speed!

Robust and efficient

Integrated by-pass with proven contactor technology

To enable lowest possible energy consumption Emotron TSA softstarters are equipped with an integrated by-pass contactor. The Emotron TSA line hereby complements the well established fully solid-state softstarters Emotron MSF.

The used types of by-pass contactors have been selected only after thorough evaluation of various contactor designs and how to best achieve a reliable and fault-tolerant design. The finally chosen solutions are able to handle repeated switching in harsh environment and fulfill the need for a safe and robust control.

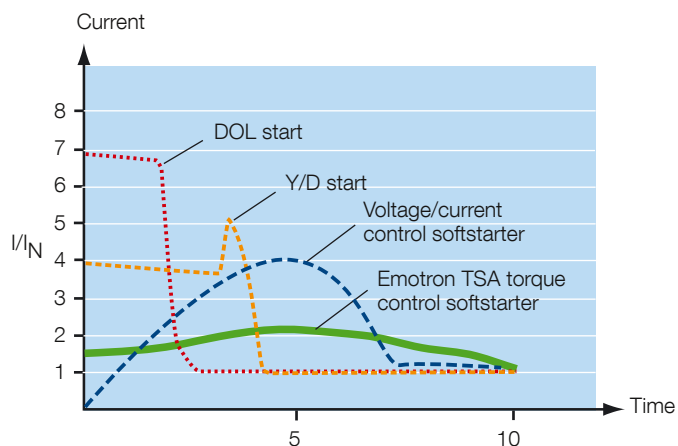
3-phase torque control

Most AC asynchronous or induction motors used in industry carry three electrical phases. Adjusting the motor torque is best done by controlling the current in all three phases. 3-phase control offers symmetrical and balanced currents without the drawbacks of additional energy losses, noise and vibration normally connected with 2-phase softstarters. Emotron TSA softstarters incorporate 3-phase control together with sophisticated algorithms for torque control. Conventional softstarters use a pre-defined voltage ramp to control the start. With Emotron TSA, the actual motor torque is continuously calculated and controlled according to the

application requirements. This torque control ensures an ultra-smooth start with constant acceleration. The torque control means the starting current is reduced even further by up to 30%. You can use smaller fuses and less expensive cables, and will thus benefit from lower installation and energy costs. The smooth starts also lead to less mechanical stress, improved process control and reduced maintenance costs.

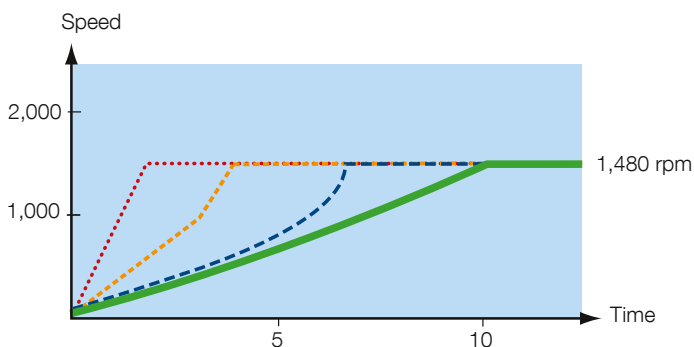
Controlled starts also with challenging loads
Torque boost can be used to overcome initial torque peaks when starting, for example, a loaded crusher or mill. This will reduce mechanical stress as well as enhance efficiency in your process. Starting a fan which is rotating in the wrong direction due to a draught, will lead to high current peaks and mechanical stress and can result in blown fuses and breakdown. An Emotron TSA softstarter gradually slows the motor to a complete stop before starting it in the right direction. Damage is prevented and mechanical vibrations are eliminated. The starting direction can be fully controlled, for example of a tunnel fan if there is a fire when controlling the direction of the air flow is critical for safety reasons. Emotron TSA offers full control without the need for an external PLC, thanks to two inputs for start left/right and built-in control of forward/reverse contactors. You will benefit from simplified installation and reduced investment costs.

Smart stops with built-in braking functionality
The definition of a smart stop depends on your application. For a pump, the aim is to slowly decrease the flow to prevent mechanical stress on pipes and valves, while a saw often requires a quick stop for security or productivity reasons. The advanced braking techniques of Emotron TSA softstarters meets both challenges just as efficiently. When stopping a pump you can benefit from the same smart principle as when starting it – a linear stop using the torque control. You no longer risk water hammer and there is no need for costly equipment such as motor-controlled valves. When a quick stop is needed, the brake functionality of Emotron TSA eliminates the need for expensive and space-consuming external brakes and saves you both investment and maintenance costs. The built-in vector brake is used for handling low braking torque loads. The built-in reverse current brake control efficiently handles high inertia loads in, for example, crusher or mill operation. It's also the solution for band saws and saw applications where extremely short braking times are required.

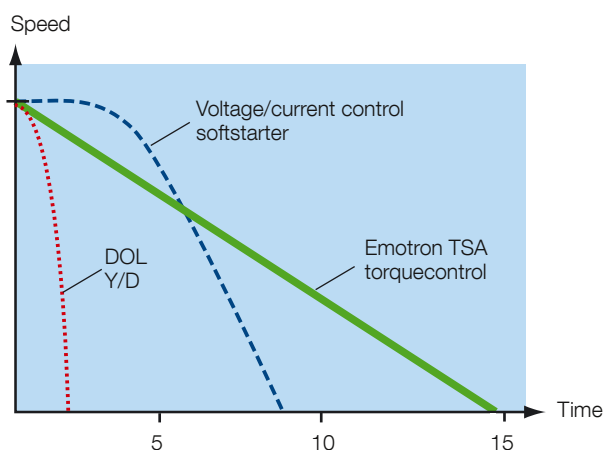


With an Emotron TSA the start current is up to 30% lower than with a conventional softstarter.

- Emotron TSA with torque control
- - - Softstarter with voltage control
- - - Y/D start
- . . . Direct on line (DOL) start



Emotron TSA offers efficient torque control that enables you to start more smoothly with constant acceleration.



The torque control ensures a linear stop that protects your pump from water hammer. No motor-controlled valves are required.



Slow speed and jog operation

Apart from ramping up and down the speed between zero and rated motor speed, Emotron TSA softstarter offer low speed operation in both forward and reverse direction without additional hardware. Slow speed or jogging forward or backward can be useful for aligning a load or having the motor running at low speeds for test or service purposes. Examples of applications where such low speed or jog operation is valuable are loading/unloading of centrifuges or mixers or positioning of feeding conveyors.

Coated boards

When used in harsh environment the lifetime of electric equipment might be on risk due to exposure to airborne aggressive substances. To improve the ability of the softstarters to withstand tough conditions the Emotron TSA units have circuit boards with conformal coating according to IEC 61721-3-3, 3C3 as standard.

Extended protection with thermal model

To enable maximum utilization of your softstarter investment the Emotron TSA units are largely self-protecting against overload. A thermal model of the softstarter secures that maximum possible number of starts can be performed without failure or unnecessary shut-downs.

Compact dimensions

Emotron TSA softstarters are among the smallest in their class. Due to the space-efficient construction and somewhat unique by-pass design a compact, but yet user friendly design has been achieved.



Clever and Easy to use

Easy to install and easy to use

Installation is quick and cost-efficient, since no additional equipment is required.

Everything you normally need is included in an Emotron TSA unit. A number of options let you customize the softstarter functionality.

Multi-lingual control panel with single-function keys and copy function

Designed for global application the Emotron TSA softstarters carry a multi-lingual display unit as standard. The control panel has a menu system with unique menu numbers and separate menu keys and start/stop keys.





Motor load monitoring with auto-set of alarm levels

The Emotron TSA softstarter has a built-in load monitor that protects your machine and process against costly downtime, equipment damage and break-down. It reacts immediately if a crusher is jammed, a pump is running dry, a compressor is idling, or a fan is operating inefficiently due to a blocked filter. This is achieved by constant viewing of the motor shaft power. Any deviation from your selected load

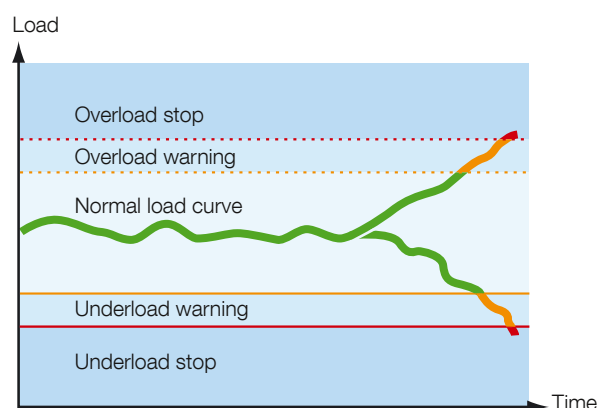
levels will result in a warning or a quick but smooth stop. The actual load can be remotely displayed via analogue or fieldbus communication output. The monitor can also be used to determine when a process is ready, for example, when the viscosity is right in a mixing process. You can rely on an efficient and reliable operation protected from damage and interruptions.

Programmable logical and timer functions with Real Time Clock

The Emotron TSA softstarter offers built-in programming blocks, such as logical functions, comparators and timers. This opens the way for customizing functionality according to your requirements. A Real Time Clock provides information about the actual date and time of the day. The real time information is used for time registration in the event log and to enable preprogrammed starting and stopping at certain date and time.

Standard inputs/outputs include:

4 Digital in, 1 Analog in, 3 Relay out, 2 Analog out and a motor PTC input.



A built-in load monitor protects your process against damage and inefficiency by sending a warning or stopping the process at your chosen load levels.

Applications

Pumps
Fans
Compressors
Blowers
Crushers
Screens
Mills
Mixers
Saws



All Emotron TSA models - size 1 to 4

EMOTRON TSA SOFTSTARTERS ARE AVAILABLE IN THE FOLLOWING RANGE:

Supply voltages: 200 – 525 VAC,
3-phase 50/60 Hz
200 – 690 VAC, 3-phase 50/60 Hz
Rated current: 16 – 1800 A
Rated power: 5.5 – 1800 kW
Control supply voltage: 100 – 240 V
Ambient temperature: 0 – 55 °C (40 °C
without derating)
Protection class:
IP20, NEMA Type 1 (Up to 800 A)
IP00, NEMA Open type (1000–1800 A)
Approvals: CE (UL, GOST R pending)

Options

One communication module and up to two option boards can be mounted.

Communication modules

- Profinet 1 or 2 ports - Industrial Ethernet communication
- Modbus/TCP – Industrial Ethernet communication
- EtherCAT - Industrial Ethernet communication
- Profibus DP- Fieldbus communication
- DeviceNet - Fieldbus communication
- Serial communication via USB or RS485, (later also Bluetooth) with Modbus RTU. RS232 as standard.

Option boards

- Extended digital I/O (3 + 3 sets I/O)
- PTC/PT-100 Motor protection (3 + 3 PT100)

Other options

- External control panel, IP54 suitable for mounting on cabinet door

Technical data

Model	Frame-size	P _{mot} 400 V [kW]	P _{mot} 460 V [hp]	I _{nom} [A]	Weight [kg]	Dim. HxWxD [mm]
		Normal duty (*)				
TSA - 016	1	7.5	10	16	5.5	296x126x 188
TSA - 022		11	15	22		
TSA - 030		15	20	30		
TSA - 036		18.5	25	36		
TSA - 042		22	30	42		
TSA - 056		30	40	56		
TSA - 070	2	37	50	70	5.7	
TSA - 085		45	60	85		
TSA - 100		55	75	100		
TSA - 140	3	75	100	140	13	323x196x 235
TSA - 170		90	125	170		
TSA - 200		110	150	200		
TSA - 240	4	132	200	240	19	411x254x 260
TSA - 300		160	250	300		
TSA - 360		200	300	360		
TSA - 450		250	350	450		
TSA - 560**	5	315	450	560	Pending	Pending
TSA - 630**		355	500	630		
TSA - 710**		400	600	710		
TSA - 820**		450	700	820		
TSA - 1000**	6	560	800	1000		
TSA - 1400**		800	1200	1400		
TSA - 1800**		1000	1500	1800		

*Normal duty: Start curr = 3 x I_{nom}, Start time = 15s for framesize 1 resp. 30s for framesizes 2 - 6, 10 starts/hour

**Preliminary data



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