

# A softstarter beyond the ordinary



Emotron MSF 2.0 Softstarter

# More than just

Starting an electrical motor involves a number of challenges, such as high start currents and mechanical stress on equipment. This results in high energy, installation and maintenance costs.

Whilst traditional softstarters handle the most common start challenges, Emotron MSF 2.0 offers a lot more. Start and stop sequences are optimized. Advanced braking techniques increase productivity. Built-in monitor functionality protects your process from inefficiency, damage and downtime. Easy installation and set-up save time and money.

In addition, the Emotron MSF is developed for selected applications, which means optimized functionality adapted to your specific needs.

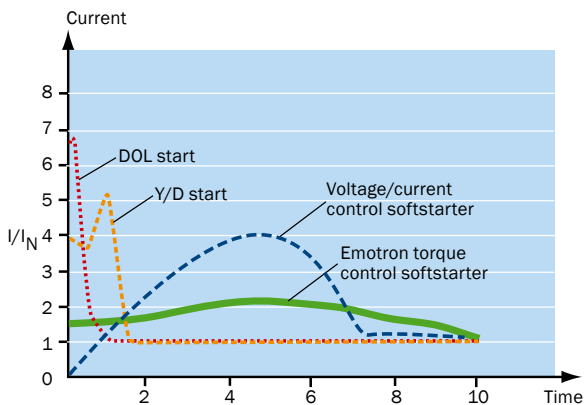
*A softstarter beyond the ordinary!*



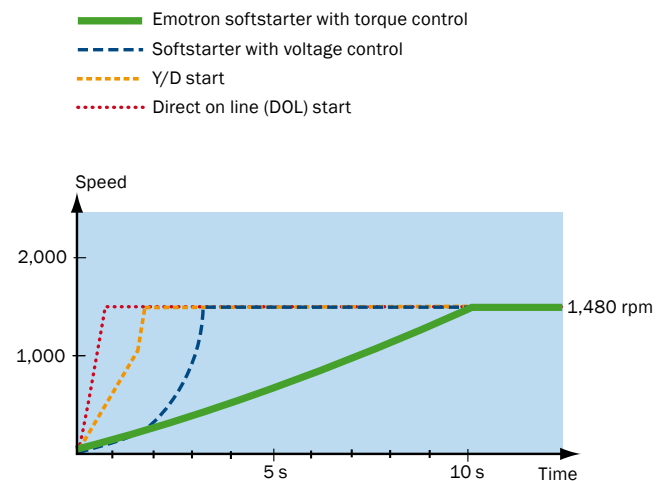
## Smooth starts reduce your costs

Conventional softstarters use a pre-defined voltage ramp to control the start. With Emotron MSF 2.0, the actual motor torque is continuously calculated and controlled according to the application requirements. This so called torque control ensures an ultra-smooth start with constant acceleration.

The torque control means the start 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.



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



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

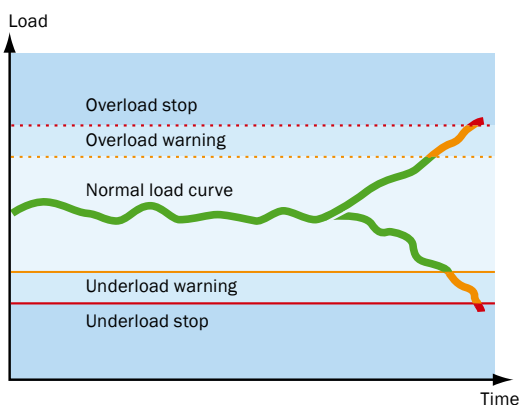
# a soft start



## Protect your process and maximize efficiency

The Emotron MSF 2.0 softstarter has a built-in shaft power monitor that protects your machine and process against costly downtime, equipment damage and breakdown. It reacts immediately if a crusher is jammed, a pump running dry or a fan 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. You can rely on an efficient and reliable operation protected from damage and interruptions.



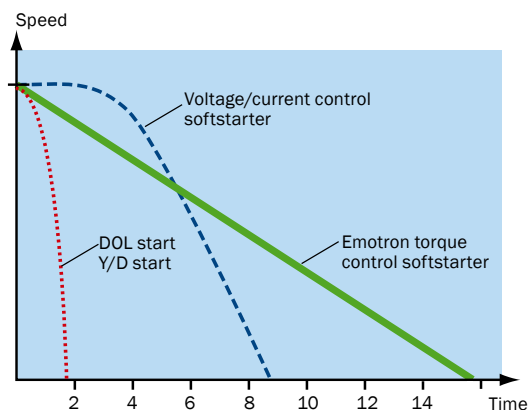
A built-in shaft power monitor protects your process against damage and inefficiency by sending a warning or stopping the process at your chosen load levels.

## Smart stops – smooth or quick

The definition of a smart stop depends on your application. For a pump, the aim is to slowly decrease the flow to prevent water hammer, while a saw often requires a quick stop for security or productivity reasons. Emotron MSF 2.0 softstarter 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, Emotron MSF offers efficient built-in brake functionality. This eliminates the need for expensive and space-consuming external brakes and saves you both investment and maintenance costs.



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

# A softstarter that me



*Emotron MSF protects your pumps against damage and downtime. No need to worry about water hammer, dry-running or cavitation – or inefficiency due to a blocked pipe or a valve not fully opened.*

## Pumps

Challenge	Emotron MSF solution	Value
High start currents require large cables and fuses. High fixed fees for power consumption.	MSF square torque control minimizes start currents.	Smaller cables and fuses can be used. Energy bills are smaller and installation costs reduced.
High initial motor torque causes mechanical stress on motor, transmission and pump.	MSF square torque control ensures smooth starts that minimize mechanical stress.	Reduced maintenance costs, minimized downtime and extended equipment lifetime.
Stopping the pump causes water hammer and mechanical stress on pipes and valves. Expensive motor-controlled valves are required.	Torque control provides linear acceleration and deceleration. Minimizes impact on equipment and eliminates need for motor-controlled valves.	Maintenance costs and downtime are minimized. Installation costs are reduced.
Dry-running and cavitation damages the pump and causes downtime.	Built-in shaft power monitor sends warning or stops the pump when load is outside your chosen limits. Actual load can be displayed via e.g. Profibus.	Damage is prevented, reducing maintenance costs and downtime.
Start and stop levels need to be controlled via analogue signal.	Analogue sensor can be connected directly to MSF to control start and stop levels.	Simplified installation and reduced investment costs since external PLC is not required.
Process inefficiency due to e.g. a blocked pipe, a valve not fully opened or sludge sticking to the impeller. Energy is wasted and equipment stressed.	Built-in shaft power monitor sends warning or stops the pump when load is outside your chosen limits. Actual load can be displayed via e.g. Profibus.	Optimized operation and minimized energy consumption. Preventive action minimizes damage and downtime.

# ets your challenges



*Emotron MSF ensures soft starts that reduce mechanical stress. Even a fan that is rotating the wrong way is started safely. You can also control the rotation direction without using a PLC.*

## Fans

Challenge	Emotron MSF solution	Value
High start currents require large cables and fuses. High fixed fees for power consumption.	MSF square torque control minimizes start currents.	Smaller cables and fuses can be used. Energy bills are smaller and installation costs reduced.
High initial motor torque causes mechanical stress on motor, transmission and fan.	MSF square torque control ensures smooth starts that minimize mechanical stress.	Reduced maintenance costs, minimized downtime and extended equipment lifetime.
Draught causes a turned-off fan to rotate in wrong direction. Starting the fan will lead to high current peaks and mechanical stress. Can result in blown fuses and breakdown.	MSF gradually slows the motor to a complete stop before starting it in the right direction.	Damage is prevented, reducing maintenance costs and downtime. Mechanical vibrations are eliminated.
Direction of air flow needs to be controlled for safety reasons, e.g. when starting a tunnel fan in an emergency.	MSF offers full control of direction thanks to two inputs for start left/right and built-in control of forward/reverse contactors.	Simplified installation and reduced investment costs since external PLC is not required.
Process inefficiency due to e.g. a broken belt, a blocked filter or a damper not being fully opened. Energy is wasted and equipment stressed.	Built-in shaft power monitor sends warning or stops the fan when load is outside your chosen limits. Actual load can be displayed via e.g. Profibus.	Optimized operation and minimized energy consumption. Preventive action minimizes damage and downtime.

# A softstarter that me



*Emotron MSF offers more than just soft starts and stops. A built-in shaft power monitor helps prevent damage and inefficiency, e.g. if the compressor is idling or cooling agent enters the screw.*

## Compressors

Challenge	Emotron MSF solution	Value
High start currents require large cables and fuses. High fixed fees for power consumption.	MSF torque control minimizes start currents.	Smaller cables and fuses can be used. Energy bills are smaller and installation costs reduced.
High initial motor torque causes mechanical stress on motor, transmission and compressor.	MSF torque control ensures smooth starts that minimize mechanical stress.	Reduced maintenance costs, minimized downtime and extended equipment lifetime.
Compressor is damaged when cooling agent enters compressor screw.	Built-in shaft power monitor immediately detects overload situation and automatically switches off the compressor.	Damage is prevented, reducing maintenance costs and downtime.
Energy is wasted when compressor is running unloaded.	Built-in shaft power monitor immediately detects underload situation. Sends warning or stops the compressor.	Optimized operation and minimized energy consumption. Extended equipment lifetime.
Process inefficiency due to e.g. a broken belt, a blocked filter or a valve not being fully opened. Energy is wasted and equipment stressed.	Built-in shaft power monitor sends warning or stops the compressor when load is outside your chosen limits. Actual load can be displayed via e.g. Profibus.	Optimized operation and minimized energy consumption. Preventive action minimizes damage and downtime.

# ets your challenges



*Emotron MSF reduces start currents and thereby your installation, maintenance and energy costs. Your blowers are also protected against damage and downtime thanks to a built-in shaft power monitor.*

## Blowers

<b>Challenge</b>	<b>Emotron MSF solution</b>	<b>Value</b>
High start currents require large cables and fuses. High fixed fees for power consumption.	MSF torque control minimizes start currents.	Smaller cables and fuses can be used. Energy bills are smaller and installation costs reduced.
High initial motor torque causes mechanical stress on motor, transmission and blower.	MSF torque control ensures smooth starts that minimize mechanical stress.	Reduced maintenance costs, minimized downtime and extended equipment lifetime.
Process inefficiency due to e.g. a broken belt, a blocked filter or a valve not being fully opened. Energy is wasted and equipment stressed.	Built-in shaft power monitor sends warning or stops the blower when load is outside your chosen limits. Actual load can be displayed via e.g. Profibus.	Optimized operation and minimized energy consumption. Preventive action minimizes damage and downtime.

# A softstarter that me



*Emotron MSF ensures smooth and efficient starts even of a heavily loaded crusher. Early warnings and safety stops minimize damage and downtime.*

## Crushers

Challenge	Emotron MSF solution	Value
High start currents require large cables and fuses. High fixed fees for power consumption.	MSF torque control minimizes start currents.	Smaller cables and fuses can be used. Energy bills are smaller and installation costs reduced.
High initial motor torque causes mechanical stress on motor, transmission and crusher.	MSF torque control ensures smooth starts that minimize mechanical stress.	Reduced maintenance costs, minimized downtime and extended equipment lifetime.
High load when starting crusher loaded with material.	Torque boost can be used at start to overcome initial torque peak.	Reduced maintenance costs and optimized operation.
Quick stops of screens are required for safety and/or productivity reasons.	Built-in vector brake offers quick and safe braking of screens. No need for mechanical brakes.	Increased safety and productivity. Reduced maintenance and installation costs.
Quick and safe stops of high inertia load are required.	Built-in reverse current brake offers quick and safe stops of high inertia loads.	Increased safety and productivity. Reduced maintenance and installation costs.
Material that could damage equipment or final product comes into the crusher.	Built-in shaft power monitor sends warning or stops the crusher when load is outside your chosen limits.	Damage is prevented, reducing maintenance costs and downtime.
Process inefficiency due to broken or worn equipment. Energy is wasted and equipment stressed.	Built-in shaft power monitor sends warning or stops the blower when load is outside your chosen limits. Actual load can be displayed via e.g. Profibus.	Operation is optimized. Preventive action minimizes damage and downtime.



# ets your challenges



*Quick and safe stops are ensured by Emotron MSF, as are smooth starts of heavily loaded mills. Early warnings or safety stops allow preventive action, e.g. if material that could cause damage gets into the mill.*

## Mills

Challenge	Emotron MSF solution	Value
High start currents require large cables and fuses. High fixed fees for power consumption.	MSF torque control minimizes start currents.	Smaller cables and fuses can be used. Energy bills are smaller and installation costs reduced.
High initial motor torque causes mechanical stress on motor, transmission and mill.	MSF torque control ensures smooth starts that minimize mechanical stress.	Reduced maintenance costs, minimized downtime and extended equipment lifetime.
High load when starting mill loaded with material.	Torque boost can be used at start to overcome initial torque peak.	Reduced maintenance costs and more efficient operation.
Quick stops are required for safety and/or productivity reasons.	Built-in vector brake offers quick braking. No need for mechanical brakes.	Increased safety and productivity. Reduced maintenance and installation costs.
Quick and safe stops of high inertia load are required.	Built-in reverse current brake offers quick and safe stops of high inertia loads.	Increased safety and productivity. Reduced maintenance and installation costs.
Material that could damage equipment or final product comes into the mill.	Built-in shaft power monitor sends warning or stops the mill when load is outside your chosen limits.	Damage is prevented, reducing maintenance costs and downtime.
Process inefficiency due to broken or worn equipment. Energy is wasted and equipment stressed.	Built-in shaft power monitor sends warning or stops the mill when load is outside your chosen limits. Actual load can be displayed via e.g. Profibus.	Operation is optimized. Preventive action minimizes damage and downtime.

# A softstarter that me



*Emotron MSF offers more than just soft starts and safe stops. It senses when the viscosity is right, thereby optimizing operation. Inefficiency is immediately detected, e.g. due to a damaged blade.*

## Mixers

<b>Challenge</b>	<b>Emotron MSF solution</b>	<b>Value</b>
High start currents require large cables and fuses. High fixed fees for power consumption.	MSF torque control minimizes start currents.	Smaller cables and fuses can be used. Energy bills are smaller and installation costs reduced.
High initial motor torque causes mechanical stress on motor, transmission and mixer.	MSF torque control ensures smooth starts that minimize mechanical stress.	Reduced maintenance costs, minimized downtime and extended equipment lifetime.
Difficult to determine when mixing process is ready.	Built-in shaft power monitor can be used to determine when viscosity is right.	Optimized operation. Higher product quality.
Process inefficiency due to e.g. a broken or damaged blade. Results in longer mixing time or process failure. Energy is wasted and equipment stressed.	Built-in shaft power monitor sends warning or stops the mixer when load is outside your chosen limits. Actual load can be displayed via e.g. Profibus.	Optimized operation and minimized energy consumption. Preventive action minimizes damage and downtime.

# ets your challenges



*Emotron MSF ensures soft starts and quick stops that enhance safety and productivity. Inefficiency due to e.g. a worn saw blade is detected immediately, minimizing downtime and maintenance costs.*

## Saws

<b>Challenge</b>	<b>Emotron MSF solution</b>	<b>Value</b>
High start currents require large cables and fuses. High fixed fees for power consumption.	MSF torque control minimizes start currents.	Smaller cables and fuses can be used. Energy bills are smaller and installation costs reduced.
High initial motor torque causes mechanical stress on motor, transmission and saw.	MSF torque control ensures smooth starts that minimize mechanical stress.	Reduced maintenance costs, minimized downtime and extended equipment lifetime.
Quick stops are required for safety and/or productivity reasons.	Built-in vector brake ensures quick and safe stops.	Increased safety and productivity. Reduced maintenance and installation costs.
Quick and safe stops of band saws or very short braking times are required.	Built-in reverse current brake ensures quick and safe stops of band saws and offers very short braking times.	Increased safety and productivity. Reduced maintenance and installation costs.
Process inefficiency due to e.g. damaged or worn saw blade. Energy is wasted and equipment stressed.	Built-in shaft power monitor sends warning or stops the saw when load is outside your chosen limits. Actual load can be displayed via e.g. Profibus.	Optimized operation and minimized energy consumption. Preventive action minimizes damage and downtime.

# Easy to install



*Emotron MSF offers versatile communication options with, for example, a control room. Analogue, digital, serial and fieldbus communication are supported.*

# and easy to use

## **Quick and cost-efficient installation**

Installing an Emotron MSF 2.0 unit is quick and cost-efficient. There is no need for any of the additional equipment usually required to complement soft starter functions – DC brakes, motor protection relays, mains failure relays, load monitors, meters, displays or switches. Everything you need is included in the Emotron MSF unit.

Programming the settings according to your needs is also quick and easy. Our manuals help you achieve optimal use of the Emotron MSF in your application.

## **Programmable inputs increase flexibility**

Emotron MSF 2.0 has four programmable inputs that offer great flexibility and extended functionality. For example, you can control the rotation direction of a fan by programming two inputs for start left and start right respectively. An external alarm signal can be connected to stop the motor if a problem occurs. Up to four different parameter sets can be selected via the programmable inputs.

## **Versatile communication options**

In many applications, the softstarter is one of several control devices. To enable communication between these devices and with e.g. a control room, Emotron MSF 2.0 provides versatile communication options:

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



*Installation is quick and cost-efficient, since no additional equipment is required. Everything you need is included in the Emotron MSF unit.*

Several process values and system parameters are available via the communication interfaces. These can be used in your control system to achieve optimal performance at minimal cost.

- Current
- Voltage
- Shaft power
- Energy consumption
- Power factor
- Shaft torque
- Operating time
- Motor thermal capacity

# Matching a wide range of motor sizes



## Technical data

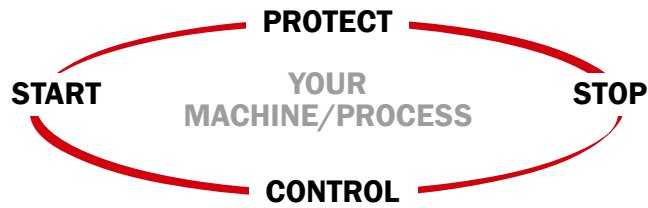
Emotron MSF 2.0 softstarters are available in the following range:

Supply voltage	200 – 690 V, 3-phase
Rated current	17 – 1,650 A
Rated power	7.5 – 1,600 kW
Protection class	IP20, NEMA 1 (up to 960 A) IP00, NEMA 0 (up to 1,650 A)

Approvals      Global standards

For further technical information, please see the Emotron MSF 2.0 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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