



**Bulletin 150 — SMC Flex Smart Motor Controller**

The SMC Flex controller provides microprocessor controlled starting for standard 3-phase squirrel-cage induction or Wye-Delta (6-lead) motors. Seven standard modes of operation are available within a single controller.

- 1...1250 A Range
- Seven Standard Start Modes
- Options Include Pump Control and Braking Control

**Features**

- Built in SCR Bypass/Run Contactor
- Built in Electronic Motor Overload Protection
- CT on each Phase
- Metering
- DPI Communication
- LCD Display
- Keypad Programming
- Four Programmable Auxiliary Contacts

The SMC Flex controller is available for motors rated 1...1250 A; 200...480V AC, 200...600V AC, or 230...690V AC, 50/60 Hz. In addition to motors, the SMC Flex controller can be used to control resistive loads.

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**Standards Compliance/Approvals**

- UL 508
- EN/IEC 60947-4-2
- cULus Listed (open type) File No. E96956
- CE Marked (open type) per EMC Directive and Low Voltage Directive
- CCC (108...480 A)

**Modes of Operation**

The SMC Flex controller provides the following modes of operation as Standard:

**Soft Start**

This method covers the most general applications. The motor is given an initial torque setting, which is user adjustable. From the initial torque level, the output voltage to the motor is steplessly increased during the acceleration ramp time, which is user adjustable.

**Selectable Kickstart**

The kickstart feature provides a boost at startup to break away loads that may require a pulse of high torque to get started. It is intended to provide a current pulse, for a selected period of time.

**Current Limit Start**

This method provides current limit start and is used when it is necessary to limit the maximum starting current. The starting current is user adjustable. The current limit stating time is user adjustable.

**Dual Ramp Start**

This starting method is useful on applications with varying loads, starting torque, and start time requirements. Dual Ramp Start offers the user the ability to select between two separate start profiles with separately adjustable ramp times and initial torque settings.

**Full Voltage Start**

This method is used in applications requiring across-the-line starting. The SMC controller performs like a solid-state contactor. Full inrush current and locked-rotor torque are realized. The SMC may be programmed to provide full voltage start in which the output voltage to the motor reaches full voltage in 1/4 second.

**Linear Speed Acceleration**

With this type of acceleration mode, a closed-loop feedback system maintains the motor acceleration at a constant rate. The required feedback signal is provided by a DC tachometer coupled to the motor (tachometer supplied by user 0...5V DC, 4.5V DC = 100% speed). Kickstart is available with this mode.

**Preset Slow Speed**

This method can be used on applications that require a slow speed for positioning material. The Preset Slow Speed can be set for either Low, 7% of base speed, or High, 15% of base speed. Reversing is also possible through programming. Speeds provided during reverse operation are Low, 10% of base speed, or High, 20% of base speed.

**Soft Stop\***

The Soft Stop option can be used in applications requiring an extended stop time. The voltage ramp down time is use adjustable from 0 to 120 seconds. The load will stop when the voltage drops to a point where the load torque is greater than the motor torque.

## Optional Modes of Operation

### Pump Control - Start and Stop\*

This option is used to reduce surges during the starting and stopping of a centrifugal pump by smoothly accelerating and decelerating the motor. The microprocessor analyzes the motor variables and generates commands which control the motor and reduce the possibility of surges occurring in the system. The pump control module also provides a built-in anti-backspin timer.

## Braking Control

### SMB Smart Motor Braking\*

This option provides motor braking for applications that require the motor to stop faster than a coast to rest. Braking control, with automatic zero speed shut off, is fully integrated into the compact design of the SMC controller. This design facilitates a clean, straight forward installation and eliminates the requirement for additional hardware such as braking contactors, resistors, timers, and speed sensors. The microprocessor based braking system applies braking current to a standard squirrel-cage induction motor. The strength of the braking current is programmable from 150...400% of full-load current.

### Accu-Stop\*

This option is used in applications requiring controlled position stopping. During stopping, braking torque is applied to the motor until it reaches preset slow speed (7% or 15% of rated speed) and holds the motor at this speed until a stop command is given. Braking torque is then applied until the motor reaches zero speed. Braking current is programmable from 0...400% of full-load current. Slow Speed Current is programmable from 0...450% of full-load current. Slow speed can be programmed for either 7% (low) or 15% (high).

### Slow Speed with Braking\*

Slow Speed with Braking is used on applications that require slow speed (in the forward direction) for positioning or alignment and also require braking control to stop. Slow speed adjustments are 7% (low) or 15% (high) of rated speed. Slow speed acceleration current is adjustable from 0...450%. Slow speed running current is adjustable from 0...450% of full-load current. Braking current is adjustable from 0...400%.

\* Not intended to be used as an emergency stop. Refer to the applicable standards for emergency stop requirements.